CHAPTER

ONE

INSTALLATION, LICENSING, AND CONFIGURATION

This chapter provides detailed instructions for installing ***FLOW-3D***, configuring software licensing, and setting up the remote solving features. If you have any trouble during the installation, please contact our support department at support@flow3d.com or by calling (505) 982-0088 and we will be happy to assist you.

1.1 Pre-installation

1.1.1 Supported operating systems

There are certain operating systems on which ***FLOW-3D*** and FlowSight are tested. While it may be possible to install and run both of these programs on other operating systems, Flow Science supports and provides installation assistance for only the following **64 bit** operating systems:

- Microsoft **Windows 7** and greater
- Microsoft **Windows Server 2008** and greater
- **Red Hat Enterprise Linux 6** and greater

Note:

- 32 bit operating systems are not supported.
- The **lmgrd** license server is not compatible with Red Hat Enterprise Linux 7. However, ***FLOW-3D*** may be run as a client using a different machine on the network as a license server.

1.1.2 Hardware requirements and recommendations

- **Processor**: An x86-64 compatible CPU is required. Multiple core CPUs, particularly **Intel Core i7** and **Intel Xeon** CPUs, are strongly recommended.
- **Memory**: The software requires a minimum of 2GB RAM per processor core. Note that the amount of RAM required is highly problem dependent. For simulations with large domains, or with complex geometry requiring fine resolution, significantly more RAM than the required minimum will be necessary. Memory speed has a small effect on simulation time and typically 1333 or 1600 MHz memory is adequate.
- **Graphics**: The FlowSight postprocessor works best with a workstation card. **nVidia Quadro K series** cards or **AMD FirePro W series** cards are highly recommended. nVidia's **GTX series** 660 and above have shown decent performance on desktop and notebook machines.
- ***FLOW-3D*** for **Windows** requires at least 1GB of free disk space. On **Linux** operating systems, at least 1.2GB of free disk space is necessary. Additional space is required for simulation results, which can be upwards of 100GB depending on the simulation.

- **Settings**: Machines that run ***FLOW-3D*** should be set to a high-performance power setting to prevent the machine from sleeping or otherwise powering-down during long-running simulations. Additionally, using automatic file compression utilities is not recommended.

1.1.3 Licensing requirements

Please ensure that you have a valid ***FLOW-3D*** license file or the name or IP address of your ***FLOW-3D*** license server before beginning the installation. If you do not have a license file or a license server please contact your sales associate or licenses@flow3d.com and provide the following information:

- The host name of the machine that will run the license server software
- Either the FlexID (if using a hardware dongle; the FlexID is printed on the side of the dongle) or the MAC address of the machine

If the MAC address is not known:

- On **Windows** operating systems, the host name and MAC address can be found by opening the command prompt and entering `ipconfig /all`. When multiple ethernet cards are present, multiple MAC addresses may be listed in the output. The connected ethernet device or the first in the series is preferable.
- On Linux operating systems, typing `/sbin/ifconfig` in a terminal window will provide the MAC address, under the heading `HWAddr`. The host name can be found by entering the `hostname` command in a terminal window. When multiple ethernet cards are present, multiple MAC addresses may be listed in the output. `eth0` is usually best, but if you are unsure which MAC address to use, please send a text file or attach a screen capture with the output of the command, and the License Administrator will determine the best option.

Once the host name and MAC address or FLEXID have been received, the License Administrator at Flow Science will send the license file (`flow3d.lic`) as an email attachment. It is an ASCII text file with encryption codes that allow it to be used only on the computer for which it was generated. Check the license file to be sure that it contains the host name and HOSTID that matches the license server. More information about licensing can be found in the *Licensing Information* section.

1.2 Installation Procedure

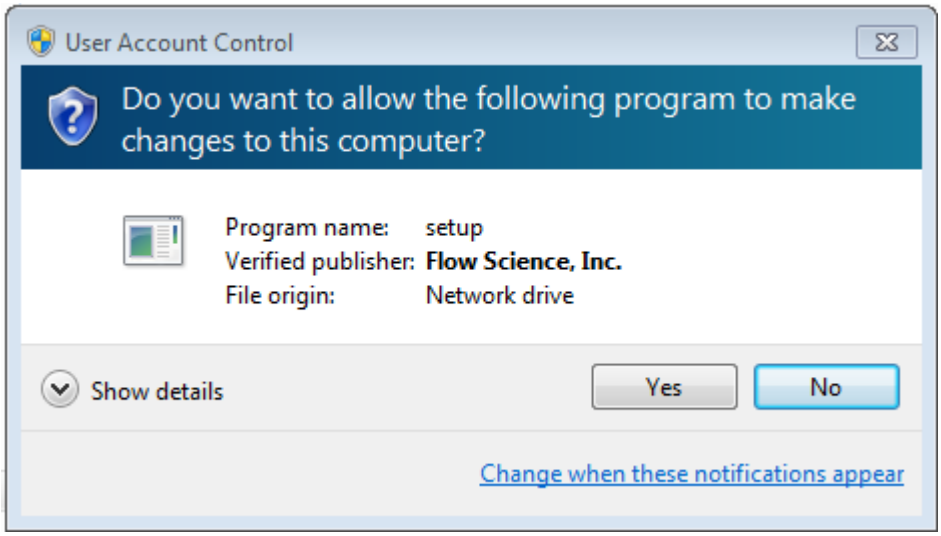
1.2.1 Windows Installation

Note:

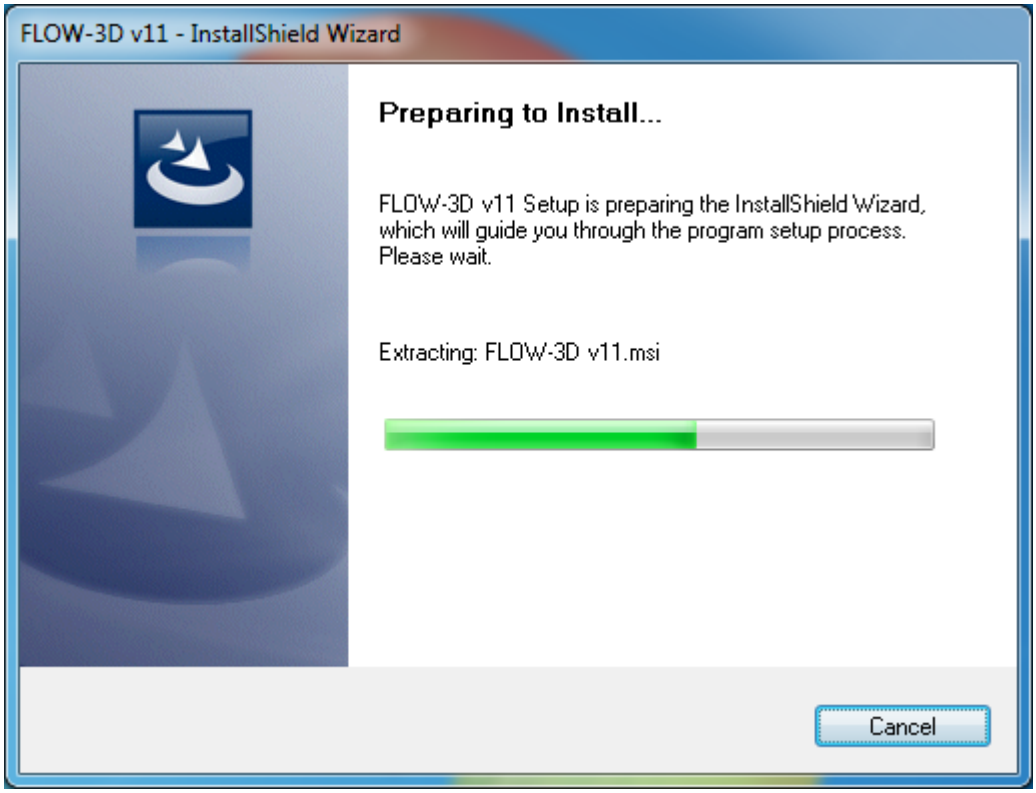
- Administrator privileges are necessary to install ***FLOW-3D*** on **Windows**. Before installing, please close all other running programs.
- If installing on the **Windows 8** operating system, please consult the *Special Considerations for Windows 8 and 8.1*.
- If installing on a machine that has ***FLOW-3D*** version 10.1 installed, please close any running copies of **RunnerServer.exe**. This can be done by either:
  - Right-clicking the green "running person" icon in the system tray and choosing *Quit*.
  - Opening the **Windows Task Manager** and stopping any `RunnerServer.exe` processes shown in the *Processes* tab. It may be necessary to click the *Show Processes from All Users* button to find the `RunnerServer.exe` process.

The installation can be started by double clicking the downloaded **flow3d.exe** file.

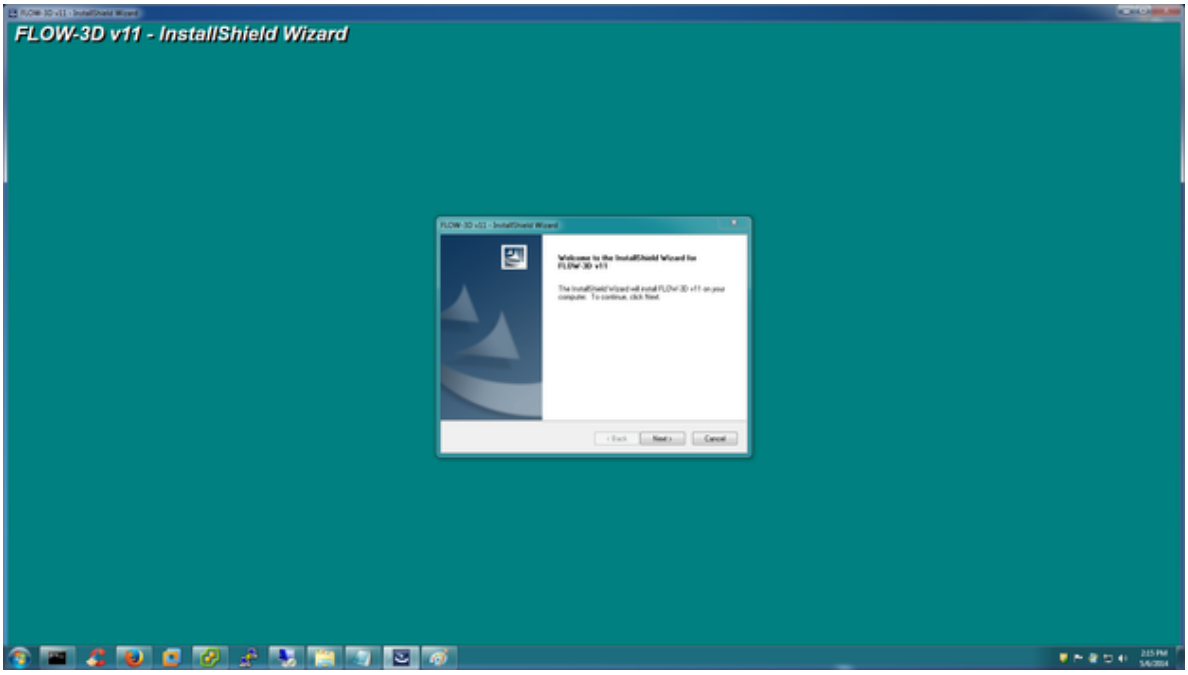
1. On **Windows** operating systems, a User Account Control dialog, similar to the one below, will appear. The "Verified publisher" entry should confirm that the executable has been digitally signed by Flow Science, Inc.


User Account Control
Do you want to allow the following program to make changes to this computer?
Program name: setup
Verified publisher: Flow Science, Inc.
File origin: Network drive
Show details
Yes
No
Change when these notifications appear

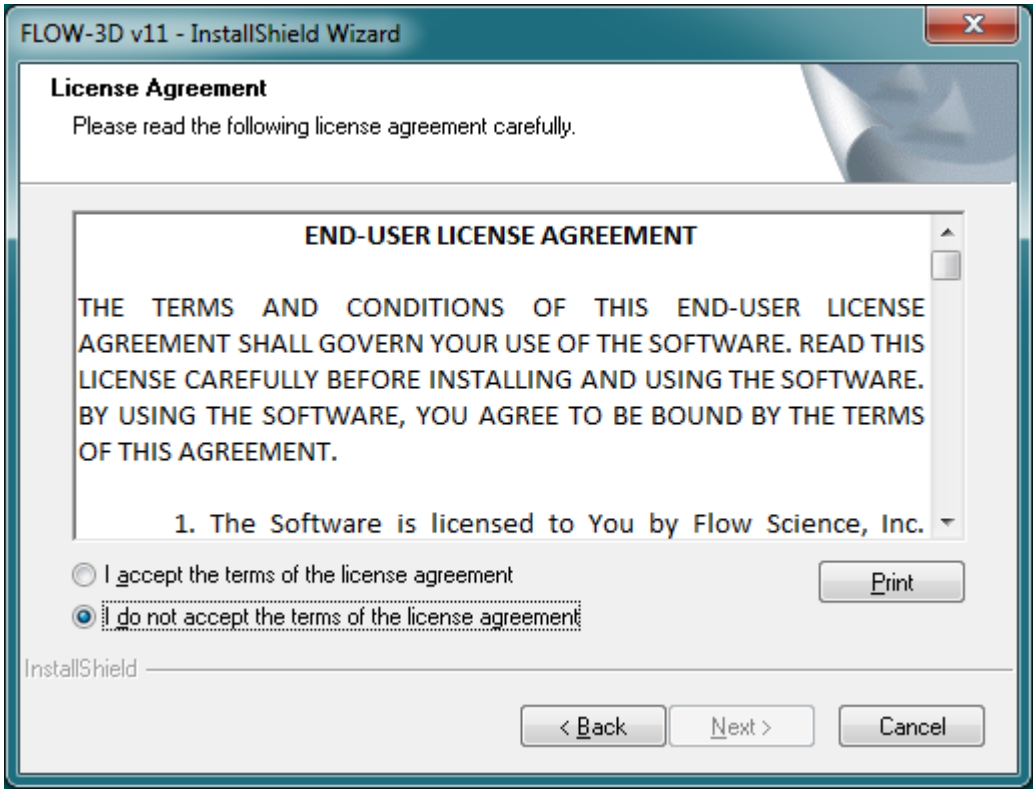
2. Next, the Preparing to Install dialog will be displayed. It requires no user input and will disappear after several seconds.


FLOW-3D v11 - InstallShield Wizard
Preparing to Install...
FLOW-3D v11 Setup is preparing the InstallShield Wizard, which will guide you through the program setup process. Please wait.
Extracting: FLOW-3D v11.msi
Cancel

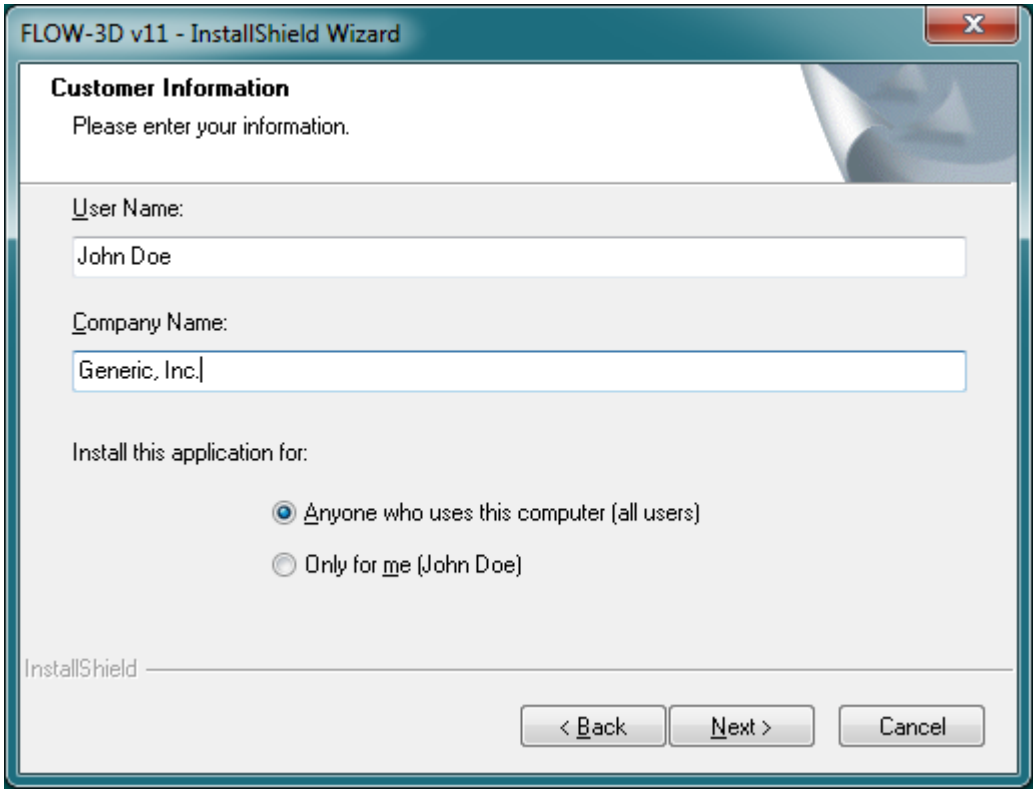
3. The next dialog to appear is the Welcome screen. Click *Next* to continue.



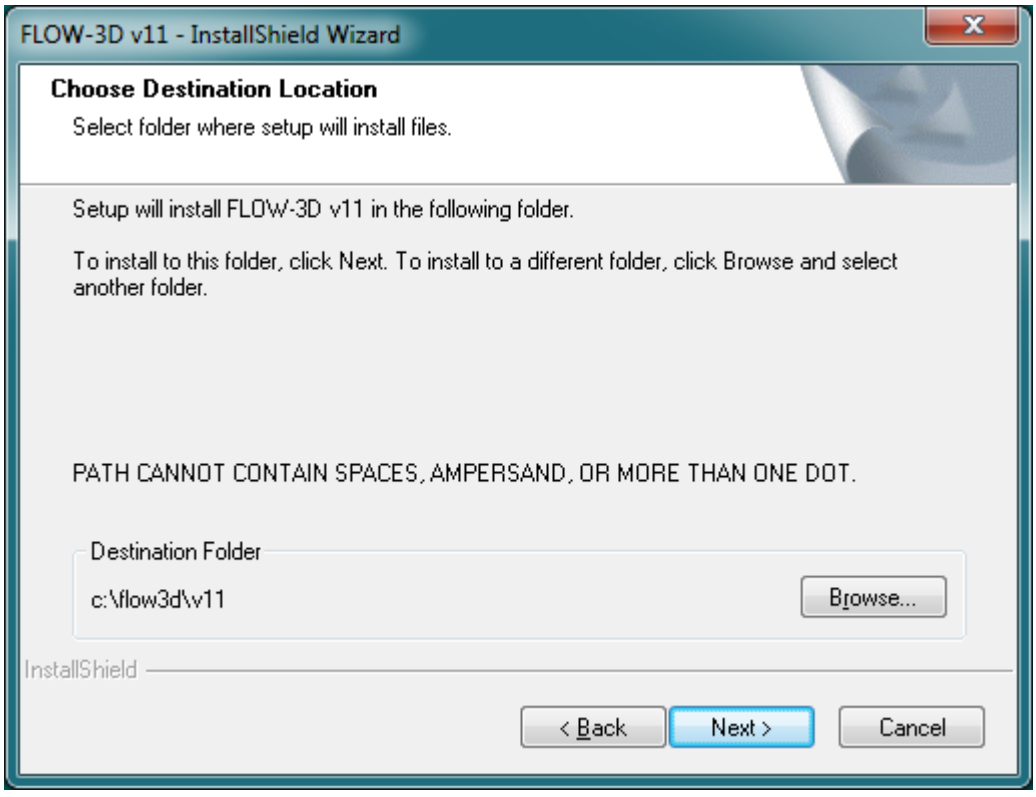
4. The next dialog is the ***FLOW-3D*** end user license agreement. Please read it carefully. If all the terms are acceptable, click the *Next* button to signify agreement and move to the next dialog.


FLOW-3D v11 - InstallShield Wizard
License Agreement
Please read the following license agreement carefully.
END-USER LICENSE AGREEMENT
THE TERMS AND CONDITIONS OF THIS END-USER LICENSE AGREEMENT SHALL GOVERN YOUR USE OF THE SOFTWARE. READ THIS LICENSE CAREFULLY BEFORE INSTALLING AND USING THE SOFTWARE. BY USING THE SOFTWARE, YOU AGREE TO BE BOUND BY THE TERMS OF THIS AGREEMENT.
1. The Software is licensed to You by Flow Science, Inc.
I accept the terms of the license agreement
I do not accept the terms of the license agreement
Print
InstallShield
< Back
Next >
Cancel

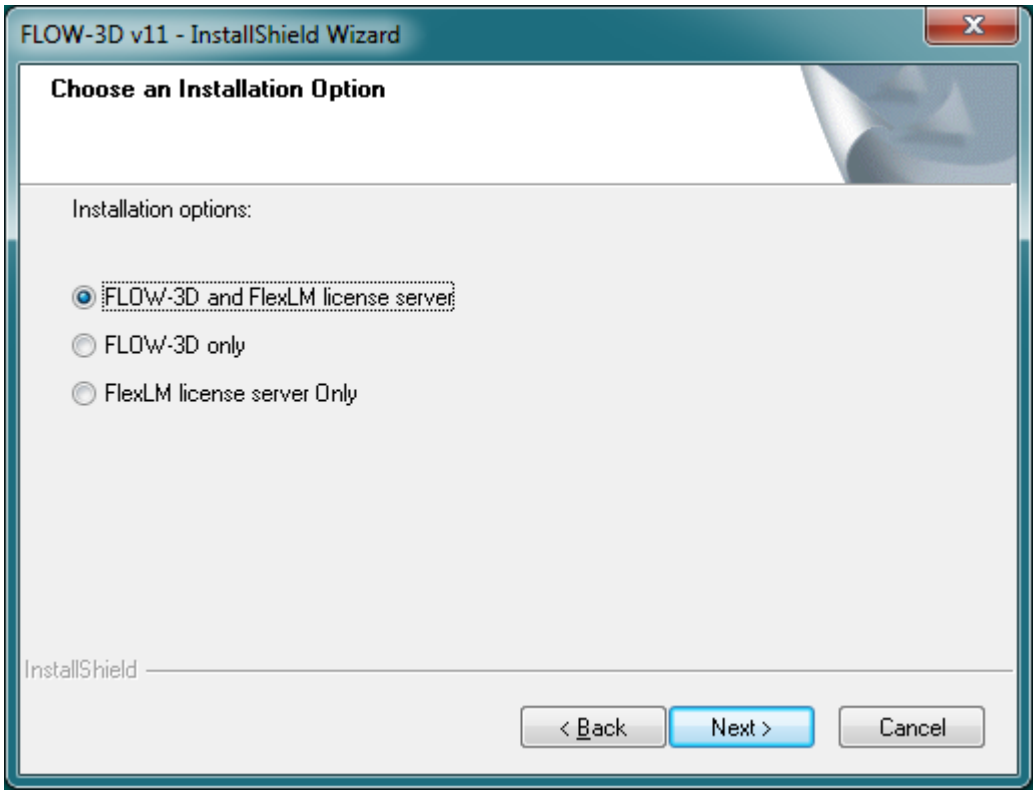
5. This dialog collects user information. Enter user and company names and click *Next* to move forward.



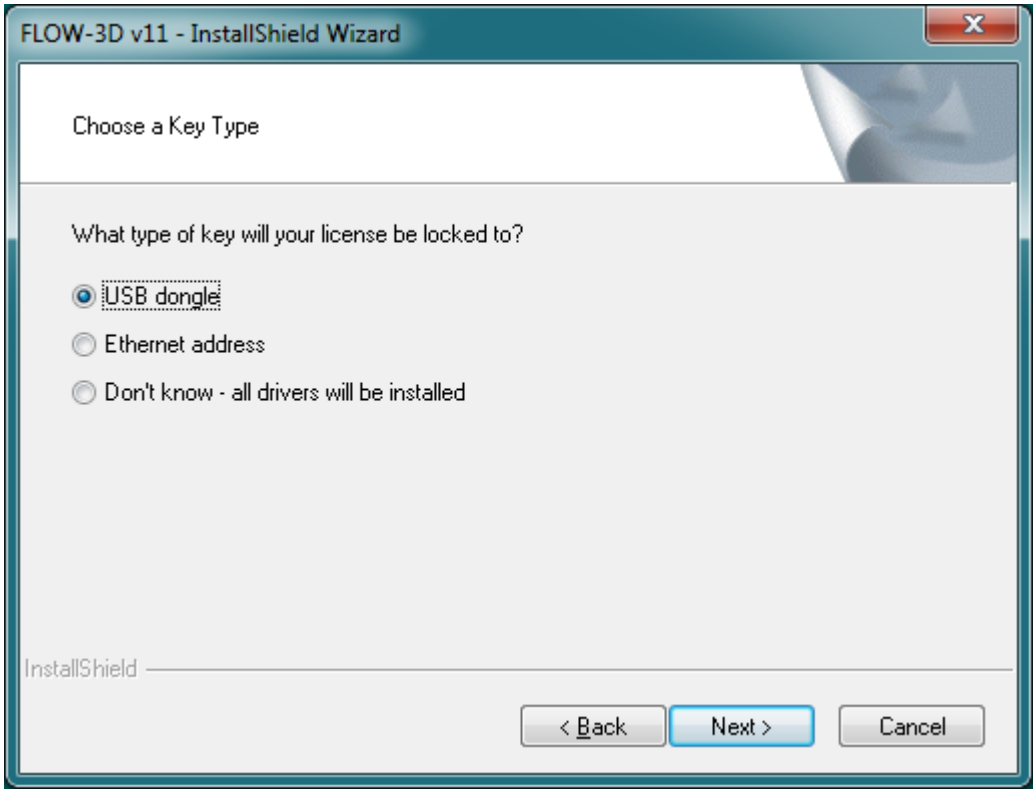
6. Now the install location can be chosen. The default directory can be used, or ***FLOW-3D*** can be installed to a specific directory. Once the location is chosen, click *Next*. When installing to a different location, it is important that the directory name not contain spaces, ampersand characters, or multiple dots.


FLOW-3D v11 - InstallShield Wizard
Choose Destination Location
Select folder where setup will install files.
Setup will install FLOW-3D v11 in the following folder.
To install to this folder, click Next. To install to a different folder, click Browse and select another folder.
PATH CANNOT CONTAIN SPACES, AMPERSAND, OR MORE THAN ONE DOT.
Destination Folder
c:\flow3d\v11
Browse...
InstallShield
< Back
Next >
Cancel

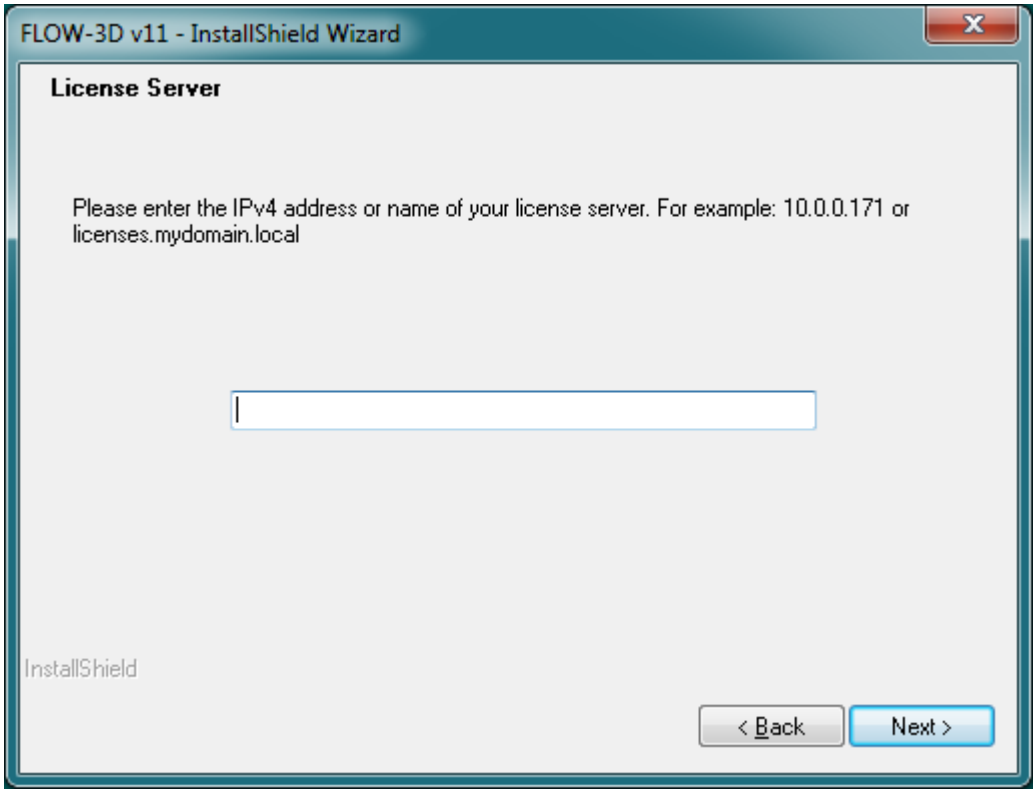
7. The installation options are shown. Choose *FLOW-3D and FlexLM license server* if this computer should contain both the ***FLOW-3D*** software and the license server software. Choose *FLOW-3D only* if the license server software i running on a different computer on the network. *FlexLM license server only* installs only the license server components; the GUI and Solver will not be installed. A *FLOW-3D only* install would then be required for machines that will connect to this license server. If the machine is intended to act as a remote server with the new Remote Solving feature, an Installation Option that includes ***FLOW-3D*** should be chosen.



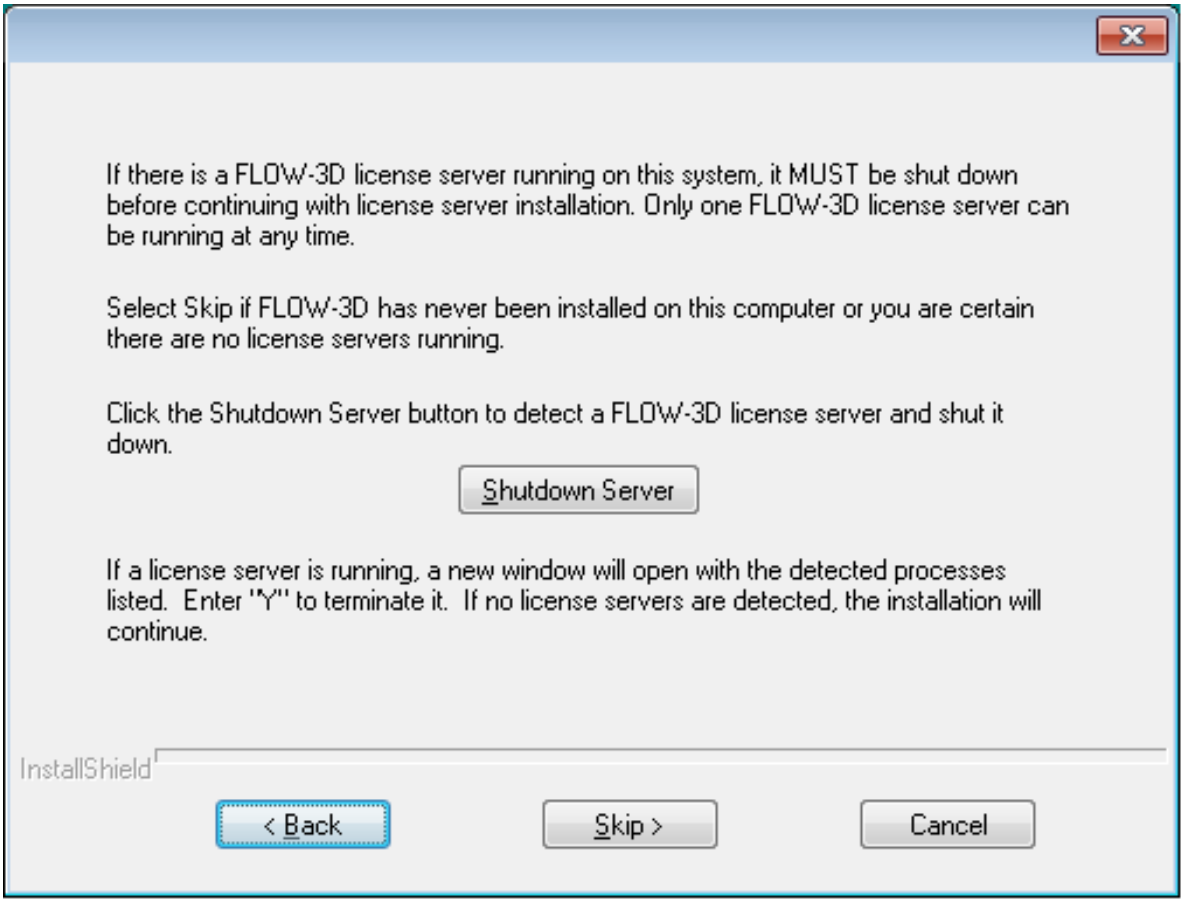
8. If the *FLOW-3D and FlexLM license server* or *FlexLM license server only* installation option was chosen in the previous step, this dialog will appear. This choice determines the appropriate drivers. The *USB dongle* or *Don't know* options will install special drivers for the FlexLM USB key.


FLOW-3D v11 - InstallShield Wizard
Choose a Key Type
What type of key will your license be locked to?
USB dongle
Ethernet address
Don't know - all drivers will be installed
InstallShield
< Back
Next >
Cancel

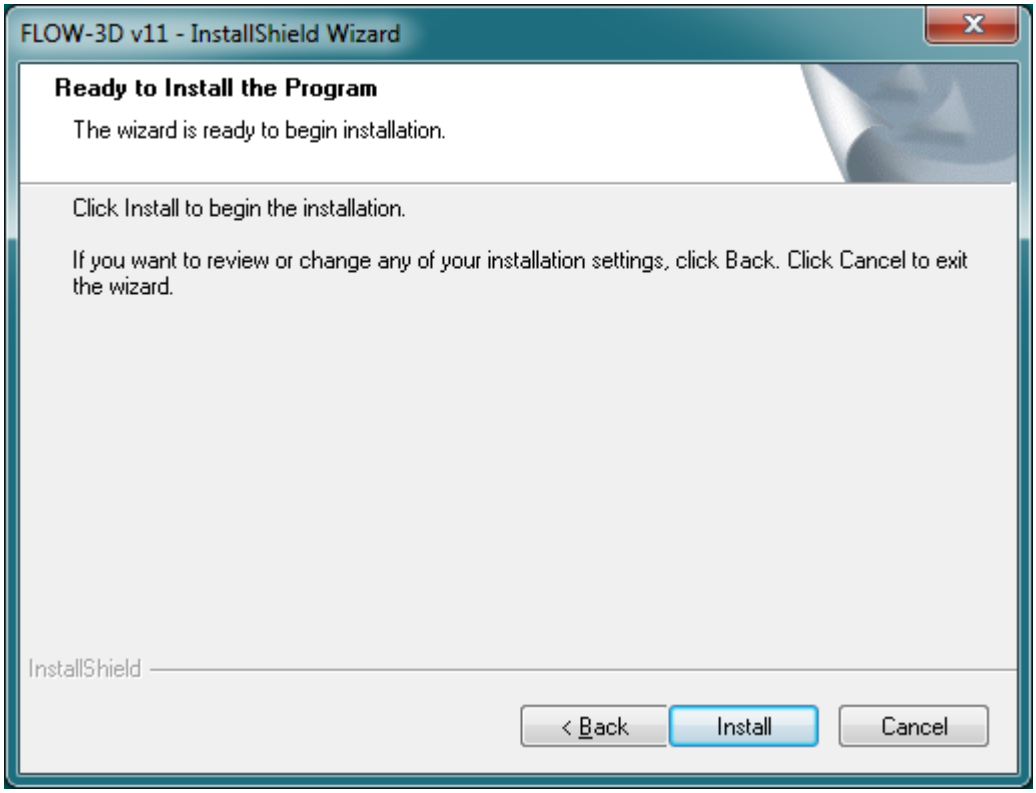
9. If the *FLOW-3D only* installation option was chosen, this dialog will be shown instead. It allows an IPv4 address or a server name to be specified for the license server. If unknown, the IP address can be found by opening the command prompt and entering `ipconfig /all` on the license server machine. The name can be determined by opening a command prompt or terminal window and issuing the command `hostname`. When using a hostname, the server should respond to `ping` requests. The name required may differ based on the network. For example, a machine may respond to `ping host.company.com` but not to `ping host`. If this is the case, the full name must be used. If the hostname entered is not reachable, the client will not be able to check out a license.


FLOW-3D v11 - InstallShield Wizard
License Server
Please enter the IPv4 address or name of your license server. For example: 10.0.0.171 or licenses.mydomain.local
InstallShield
< Back
Next >

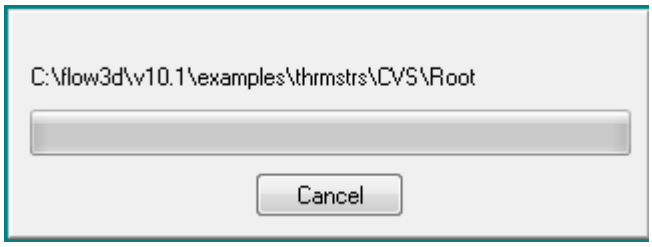
10. If a license server is being installed, ***FLOW-3D*** will ask to temporarily shut down any existing license servers. This allows the ***FLOW-3D*** license as well as **FlexLM** licenses from other vendors to be served. This can only be skipped safely when no other software that uses **FlexLM** licensing is installed, including older versions of ***FLOW-3D***.


If there is a FLOW-3D license server running on this system, it MUST be shut down before continuing with license server installation. Only one FLOW-3D license server can be running at any time.
Select Skip if FLOW-3D has never been installed on this computer or you are certain there are no license servers running.
Click the Shutdown Server button to detect a FLOW-3D license server and shut it down.
Shutdown Server
If a license server is running, a new window will open with the detected processes listed. Enter "Y" to terminate it. If no license servers are detected, the installation will continue.
InstallShield
< Back
Skip >
Cancel

11. ***FLOW-3D*** is now ready to install.


FLOW-3D v11 - InstallShield Wizard
Ready to Install the Program
The wizard is ready to begin installation.
Click Install to begin the installation.
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
InstallShield
< Back
Install
Cancel

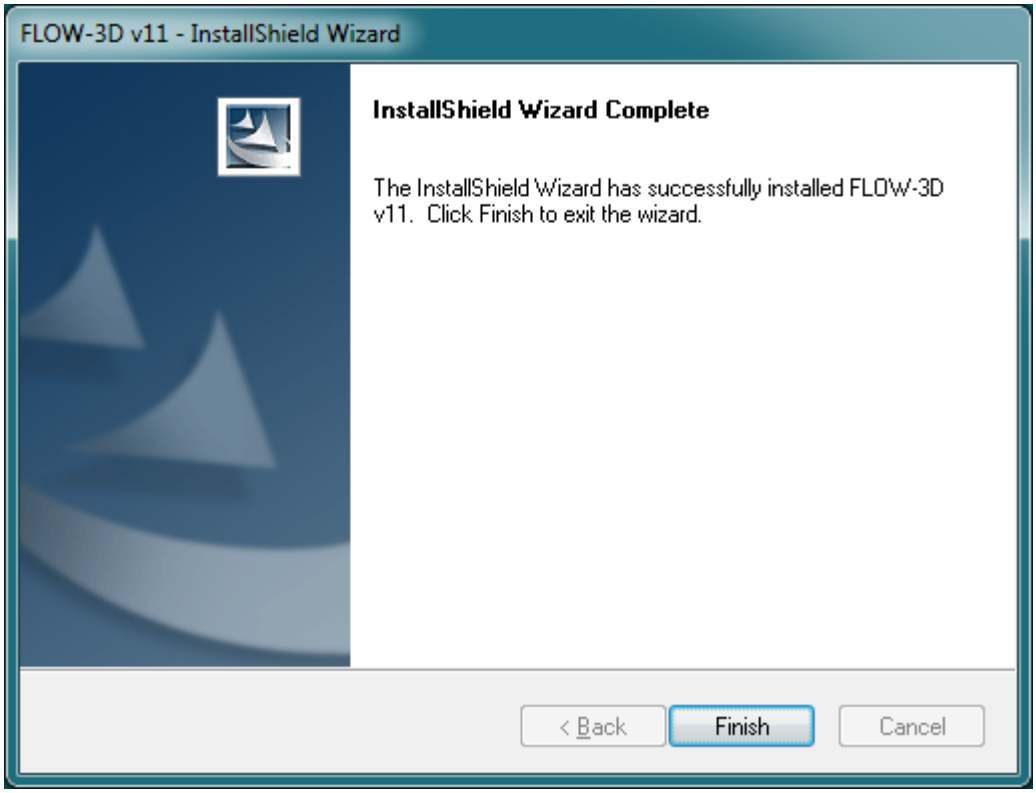
12. The ***FLOW-3D*** installer will copy the necessary files.



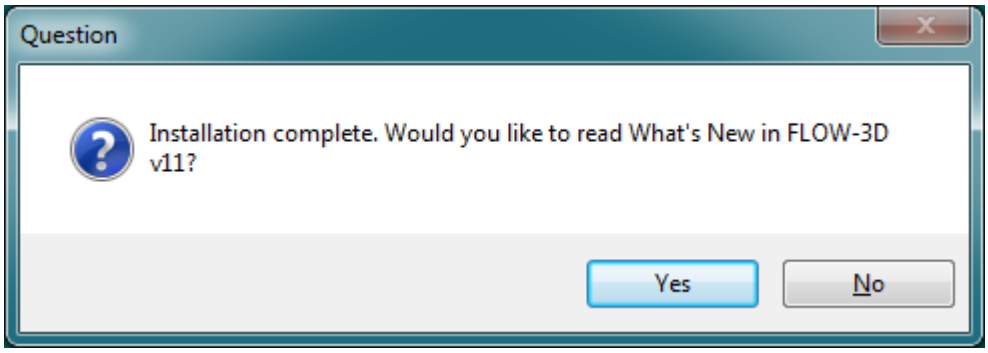
13. Next, the installer will create firewall exceptions to allow communication to remote license servers and for the new remote solving capability.

14. Finally, the Microsoft Visual C++ redistributables will be installed.

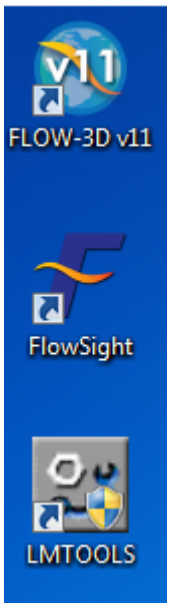
15. The installation is now complete.


FLOW-3D v11 - InstallShield Wizard
InstallShield Wizard Complete
The InstallShield Wizard has successfully installed FLOW-3D v11. Click Finish to exit the wizard.
< Back
Finish
Cancel

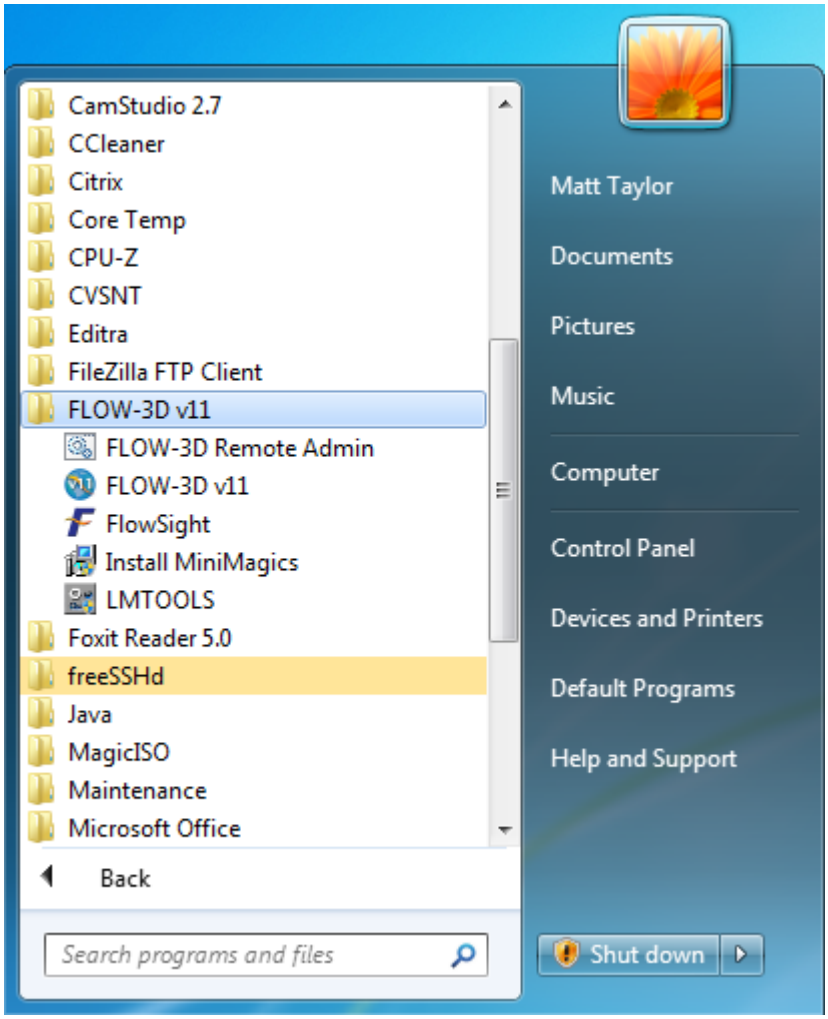
16. After installation, an opportunity is presented to learn about new features.



17. The ***FLOW-3D***, FlowSight, and **LMTOOLS** icons will now appear on the desktop. LMTOOLS allows for interaction and configuration of local or remote license servers.



18. Also, there will be a new *Program Group* in the **Windows** *Start Menu*.

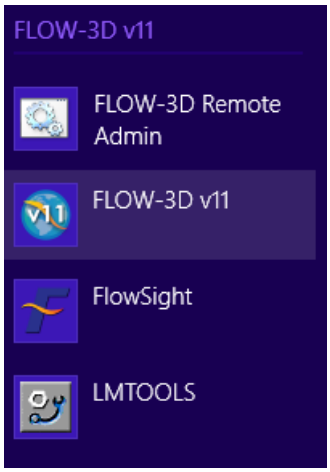


Special Considerations for Windows 8 and 8.1

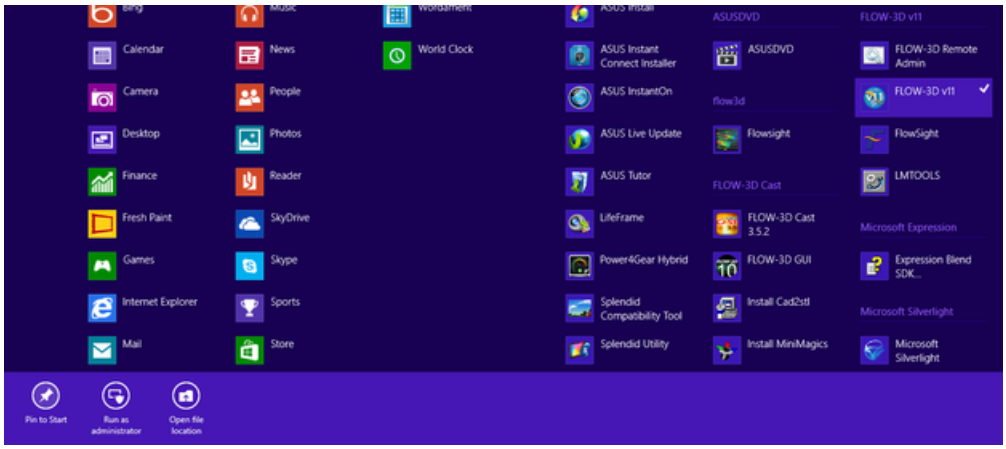
Flow Science highly recommends updating **Windows 8** to **version 8.1 Update 1** (or the newest version available) before installing ***FLOW-3D***.

- On all versions of the **Windows 8** operating system, including those which have been updated, the following considerations apply:
  - Secure boot must be disabled for the **Sentinel HASP USB drivers** to install. Please see http://technet.microsoft.com/en-us/library/dn481258.aspx for the procedure.
  - The "Creating Firewall Exceptions" dialog is not shown. However, the firewall exceptions are created.
- When the **Windows 8** operating system has not been updated, the desktop icons are not created by the installer automatically.
  - One potential solution is to install a third-party Start Menu replacement, such as **Classic Shell** or **Start8**. If a Start Menu replacement is installed prior to installing ***FLOW-3D***, the icons will be created correctly.
  - Another option is to use the Modern interface *All Apps* view. This can be done by right-clicking the Start Screen, then clicking *All Apps* at the lower right.

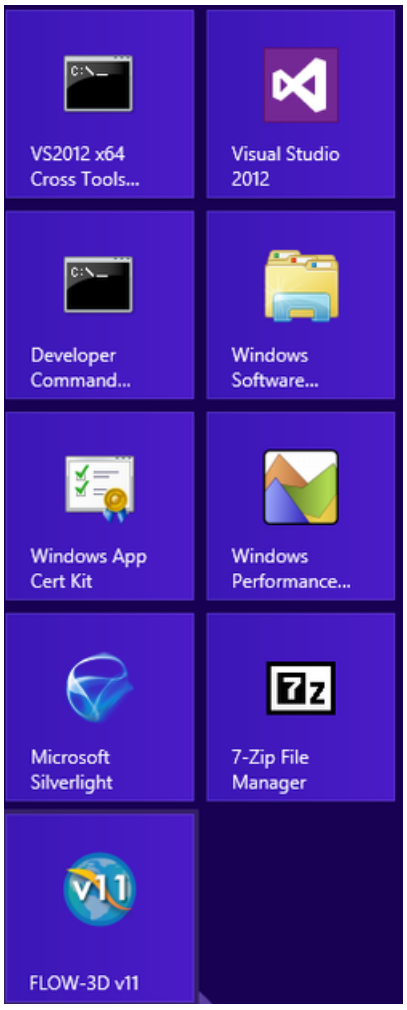
    There will be a Program Group for ***FLOW-3D***.

    Right-click one of the icons and choose *Pin to Start* at the lower left to place the icon on the main Start Screen.



The icon should now appear on the main Start Screen and can be used to launch the program.



Special Considerations for Remote Desktop

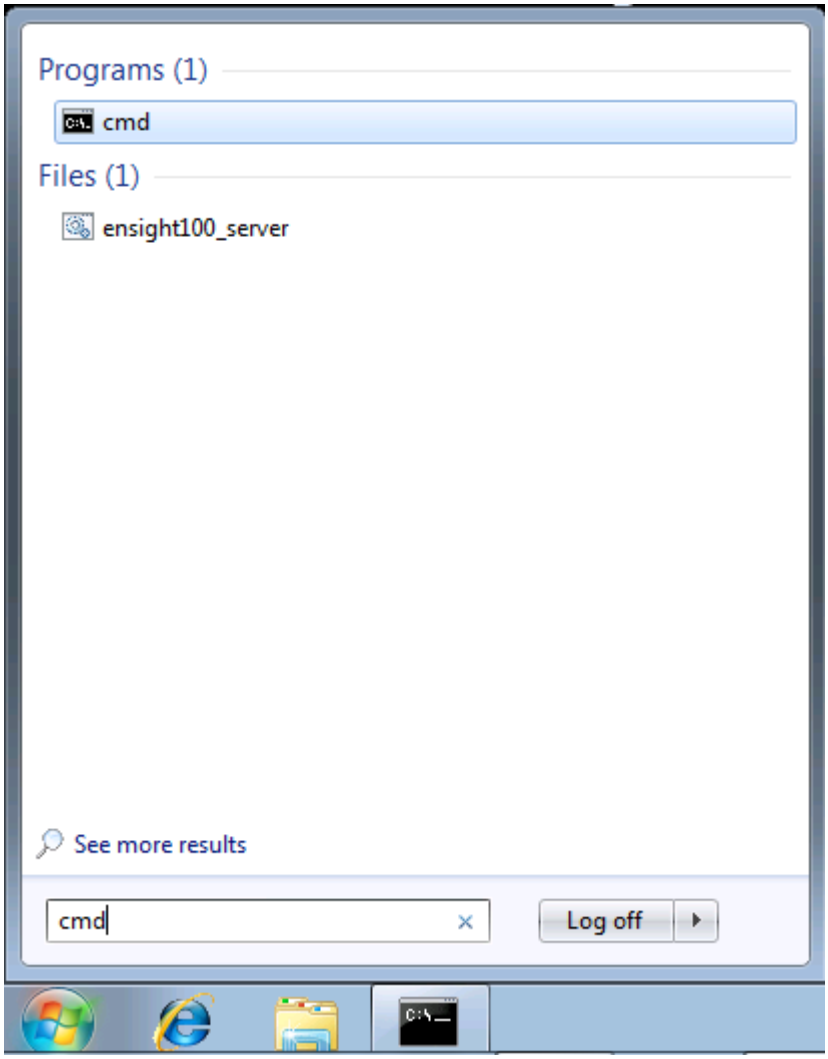
When connecting to a remote desktop session, Windows uses software rendering by default. This impacts performance negatively for both ***FLOW-3D*** and FlowSight.

To determine whether FLOW-3D is using software rendering, choose *About* from the ***FLOW-3D*** *Help* menu. The entry for *GL_RENDERER* will show *GDI Generic* if software rendering is being used.

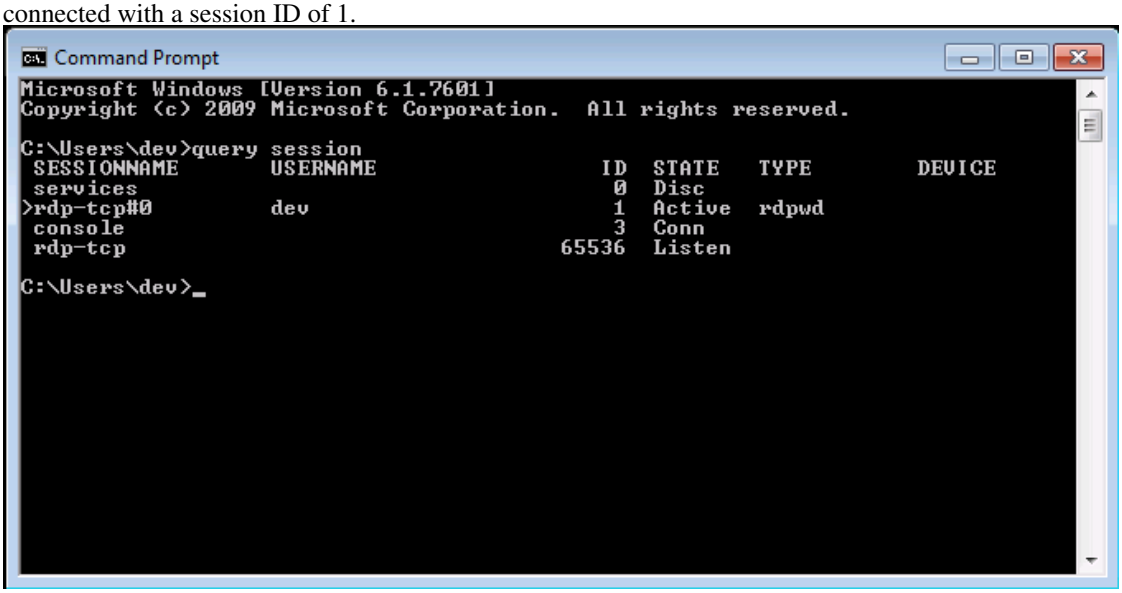
Interface version	11.0.2.0 09/1
Solver version	hydr3d versic
Host Name	cast-test
Operating System	Microsoft Win
Number of Processors	2
Total Physical Memory (RAM)	2.04688 GB
F3D_HOME	C:\flow3d\v11
User F3D Home	C:\Users\dev\
f3dtknux_license_file	@10.0.0.28
GL_RENDERER	GDI Generic

If software rendering is being used, there are several options to enable hardware rendering. One easy option is to start ***FLOW-3D*** from the physical console, then connect the remote desktop session. Some VNC software uses hardware rendering by default. Finally, the **TSCON** command can be added to the batch file used to launch ***FLOW-3D*** to temporarily pass control back to the console session. This option will be discussed.

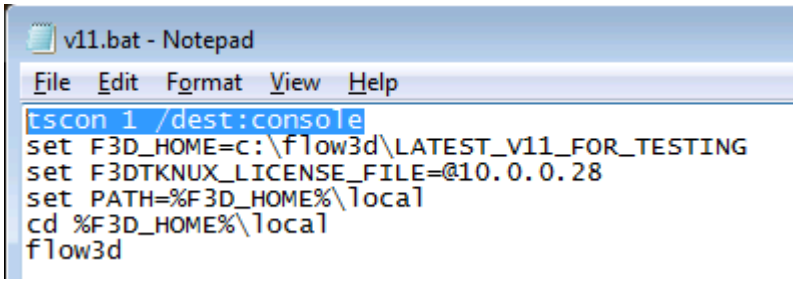
To use **TSCON**, determine which session is connected. This can be determined using a query. Click the Start button and type **cmd** in the box labeled **Search programs and files**. Click `cmd.exe` when it appears at the top of this window to open a **command prompt**.



At the prompt, type **query session** to receive a list of sessions. The relevant remote desktop session will be listed with a greater than symbol to its left and show the username with which you logged in. In this example, user dev is connected with a session ID of 1.



To connect session 1 (for example) to the console, add **tscon 1 /dest:console** to the beginning of the FLOW-3D launch batch file (replace 1 with your session ID). To edit the batch file, right-click the ***FLOW-3D*** desktop icon and choose **Edit** or navigate to `%F3D_HOME%\local`, right-click `flow3d.bat` and choose **Edit**. In the resulting notepad window, the line can be added. It should be placed before all other lines in the file.



After editing the file, save it and launch ***FLOW-3D***. The remote desktop session will be ended, and when reconnected, the hardware renderer should now be shown in the *About* menu.

Some caveats:

1. The **TSCON** command must be run as administrator. If Error 5 occurs, right-click the ***FLOW-3D*** desktop icon and choose Run as Administrator.
2. The host machine must have an OpenGL-capable graphics card.
3. Due to the graphics requirement, this will not work for virtual machines.
4. The user must have a console session. This may not work after a reboot and is known not to work when another user is logged into the console session.

1.2.2 Linux Installation

FLOW-3D for Linux is distributed as a gzip-compressed tar archive, often called a tarball. The installation files can be extracted from `flow3d.tar.gz` in a terminal window, using the command `tar -xzvf flow3d.tar.gz`. The tarball can be unpacked into any directory on the filesystem using the -C flag. For example, to extract the tarball to /home/user, use `tar -xzvf flow3d.tar.gz -C /home/user`.

Once in the directory where the installation files exist, or to which they have been unpacked, the script `install` can be run. A preceding dotslash may be necessary depending on whether the current directory is on the system PATH (i.e., `./install`). By default, this file is executable. ***FLOW-3D*** is only supported on Red Hat Enterprise Linux 6 or greater. It may be possible to install on other distributions, but due to potential library and package differences, Flow Science does not provide technical assistance on these distributions.

Note:

- The FlowSight visualization software requires `libstdc++.so.5`. This may be installed with `yum install compat-libstdc++-33`.
- The license server is not compatible with Red Hat Enterprise Linux 7.
- The installation must be done as **root**.
- The default installation directory is `/opt/flow3d`.

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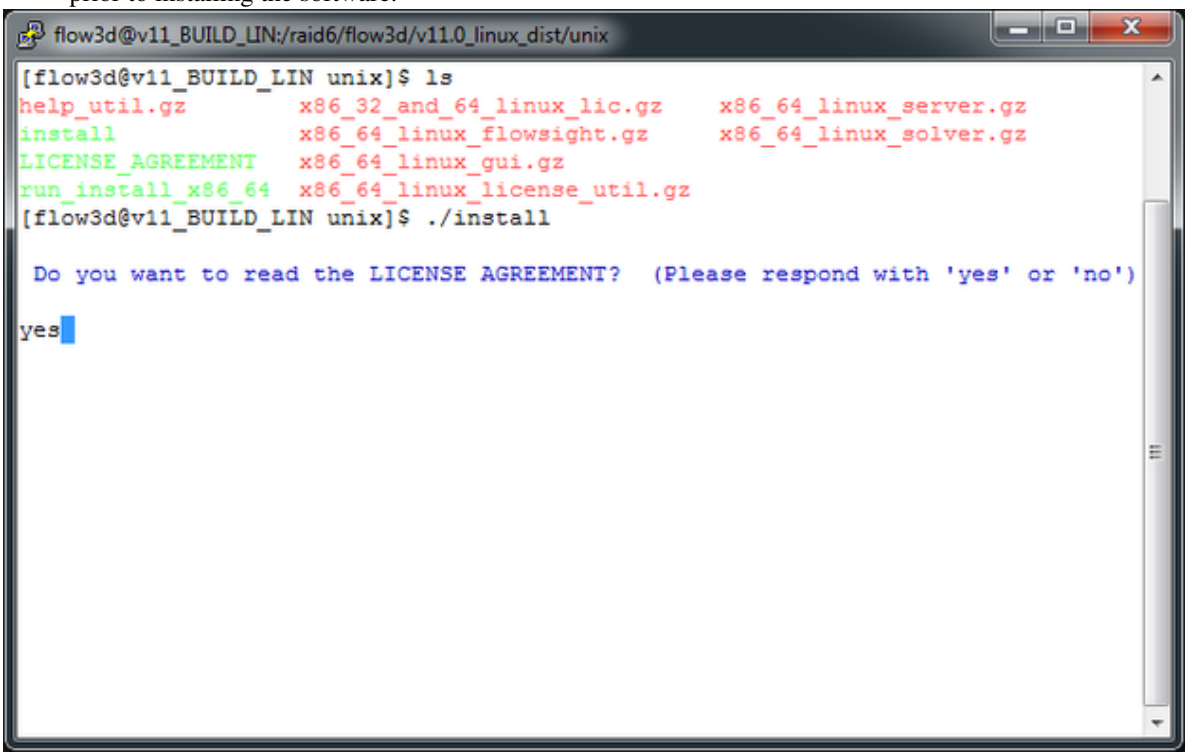
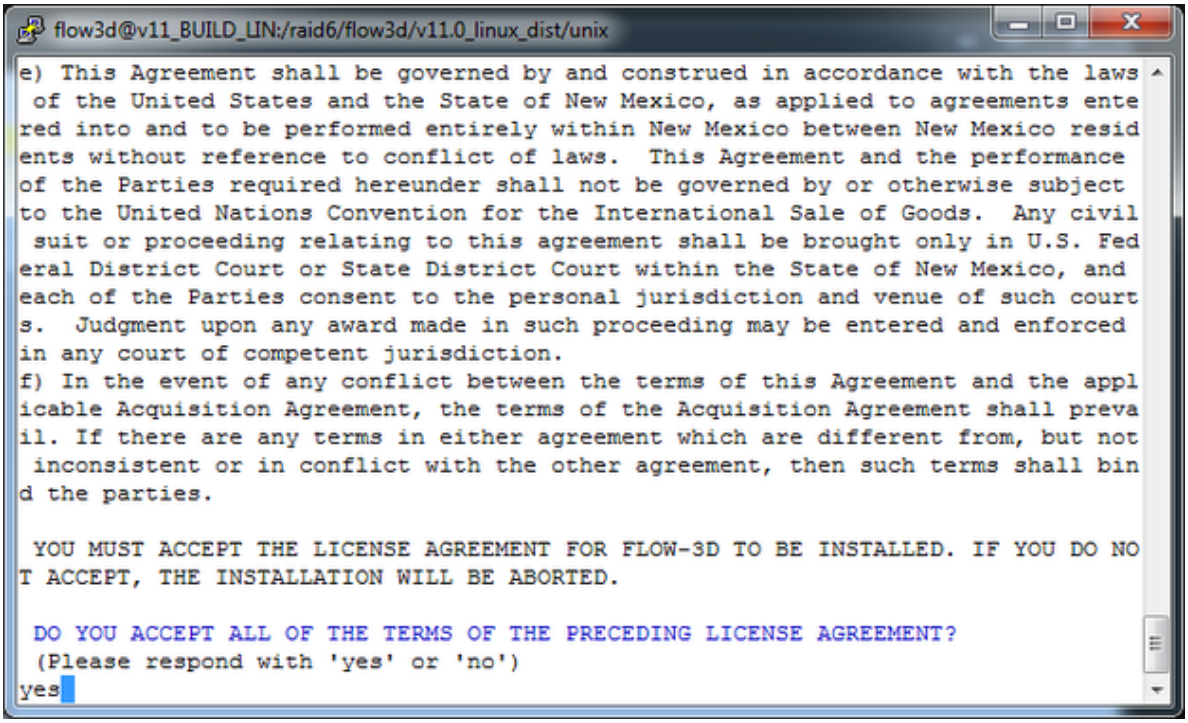
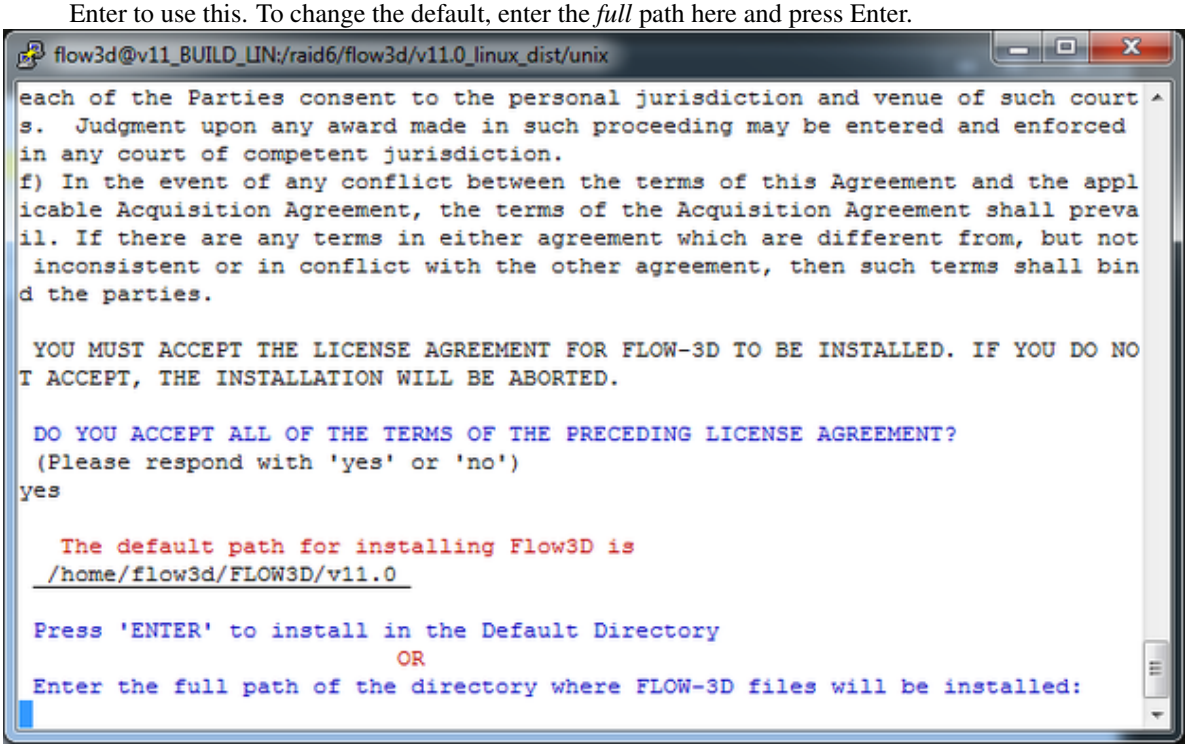
1. Execute the install script in the directory where the tarball was unpacked. The license agreement can be read prior to installing the software.



2. If all the terms are acceptable, typing `y` or `yes` and pressing Enter will continue the installation.

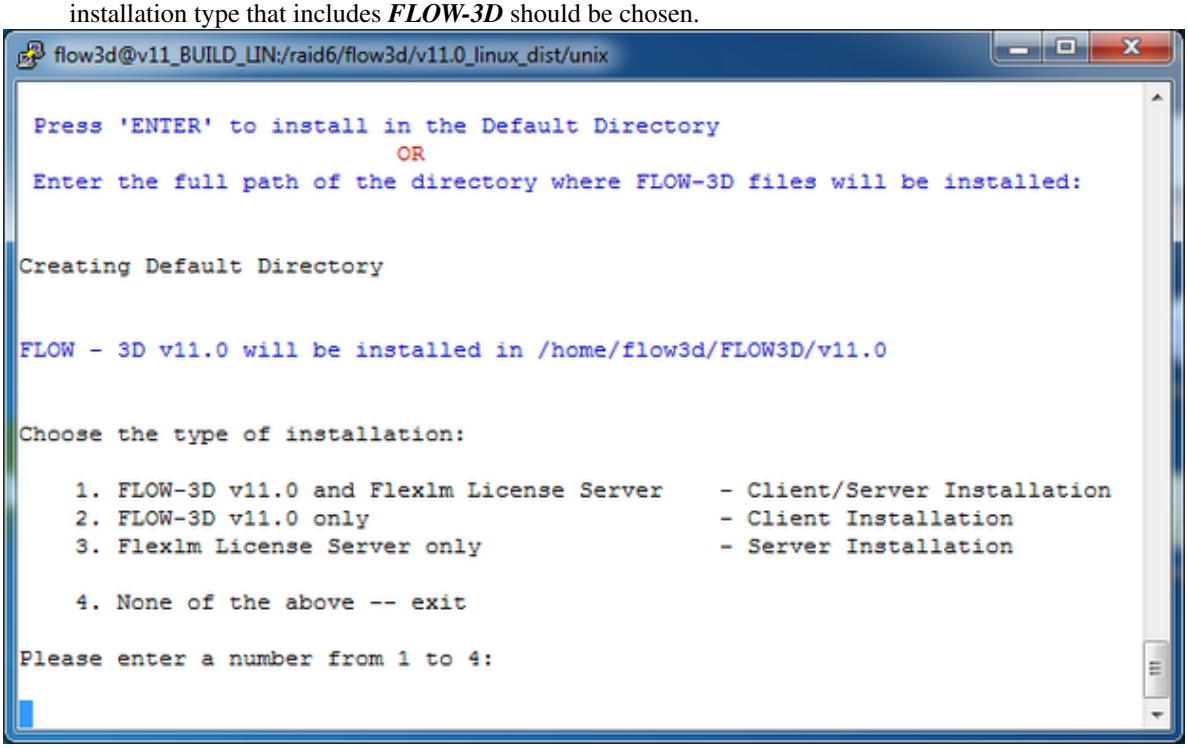

flow3d@v11_BUILD_LIN:/raid6/flow3d/v11.0_linux_dist/unix
e) This Agreement shall be governed by and construed in accordance with the laws
of the United States and the State of New Mexico, as applied to agreements ente
red into and to be performed entirely within New Mexico between New Mexico resid
ents without reference to conflict of laws. This Agreement and the performance
of the Parties required hereunder shall not be governed by or otherwise subject
to the United Nations Convention for the International Sale of Goods. Any civil
suit or proceeding relating to this agreement shall be brought only in U.S. Fed
eral District Court or State District Court within the State of New Mexico, and
each of the Parties consent to the personal jurisdiction and venue of such court
s. Judgment upon any award made in such proceeding may be entered and enforced
in any court of competent jurisdiction.
f) In the event of any conflict between the terms of this Agreement and the appl
icable Acquisition Agreement, the terms of the Acquisition Agreement shall preva
il. If there are any terms in either agreement which are different from, but not
inconsistent or in conflict with the other agreement, then such terms shall bin
d the parties.
YOU MUST ACCEPT THE LICENSE AGREEMENT FOR FLOW-3D TO BE INSTALLED. IF YOU DO NO
T ACCEPT, THE INSTALLATION WILL BE ABORTED.
DO YOU ACCEPT ALL OF THE TERMS OF THE PRECEDING LICENSE AGREEMENT?
(Please respond with 'yes' or 'no')
yes

3. ***FLOW-3D*** can be installed to a directory of your choosing. The default is `/opt/flow3d/v11.0.3`. Press Enter to use this. To change the default, enter the *full* path here and press Enter.

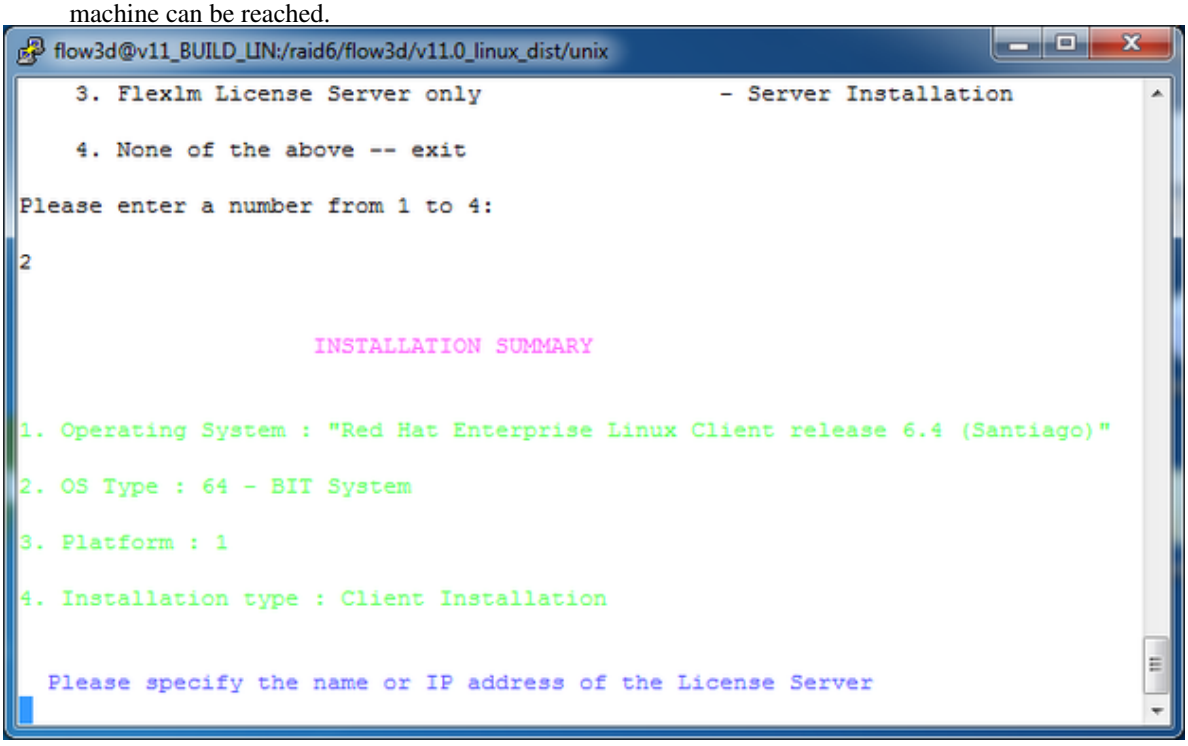

flow3d@v11_BUILD_LIN:/raid6/flow3d/v11.0_linux_dist/unix
each of the Parties consent to the personal jurisdiction and venue of such court
s. Judgment upon any award made in such proceeding may be entered and enforced
in any court of competent jurisdiction.
f) In the event of any conflict between the terms of this Agreement and the appl
icable Acquisition Agreement, the terms of the Acquisition Agreement shall preva
il. If there are any terms in either agreement which are different from, but not
inconsistent or in conflict with the other agreement, then such terms shall bin
d the parties.
YOU MUST ACCEPT THE LICENSE AGREEMENT FOR FLOW-3D TO BE INSTALLED. IF YOU DO NO
T ACCEPT, THE INSTALLATION WILL BE ABORTED.
DO YOU ACCEPT ALL OF THE TERMS OF THE PRECEDING LICENSE AGREEMENT?
(Please respond with 'yes' or 'no')
yes
The default path for installing Flow3D is
/home/flow3d/FLOW3D/v11.0
Press 'ENTER' to install in the Default Directory
OR
Enter the full path of the directory where FLOW-3D files will be installed:

4. After the directory has been determined, an installation type may be chosen. . The *FLOW-3D v11.0 and Flexlm License Server* option is used if this machine should contain both ***FLOW-3D*** and the license server software. *FLOW-3D v11.0 only* is used if this is a client machine that will connect to a remote license server. Finally, *Flexlm License Server only* is used when this machine will only run the license server software; the GUI and Solver will not be installed. A *FLOW-3D Only* install would then be required for machines that will connect to this license server. If the machine is intended to act as a remote server with the new Remote Solving feature, an

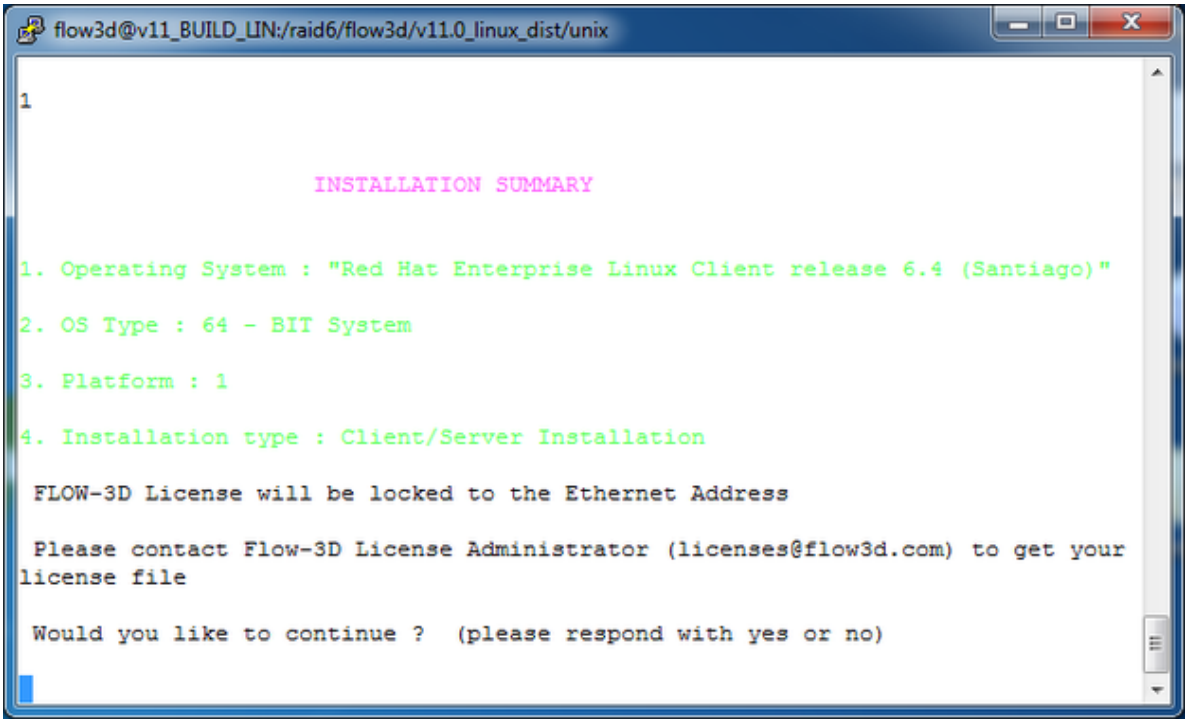
installation type that includes ***FLOW-3D*** should be chosen.


flow3d@v11_BUILD_LIN:/raid6/flow3d/v11.0_linux_dist/unix
Press 'ENTER' to install in the Default Directory
OR
Enter the full path of the directory where FLOW-3D files will be installed:
Creating Default Directory
FLOW - 3D v11.0 will be installed in /home/flow3d/FLOW3D/v11.0
Choose the type of installation:
1. FLOW-3D v11.0 and Flexlm License Server - Client/Server Installation
2. FLOW-3D v11.0 only - Client Installation
3. Flexlm License Server only - Server Installation
4. None of the above -- exit
Please enter a number from 1 to 4:

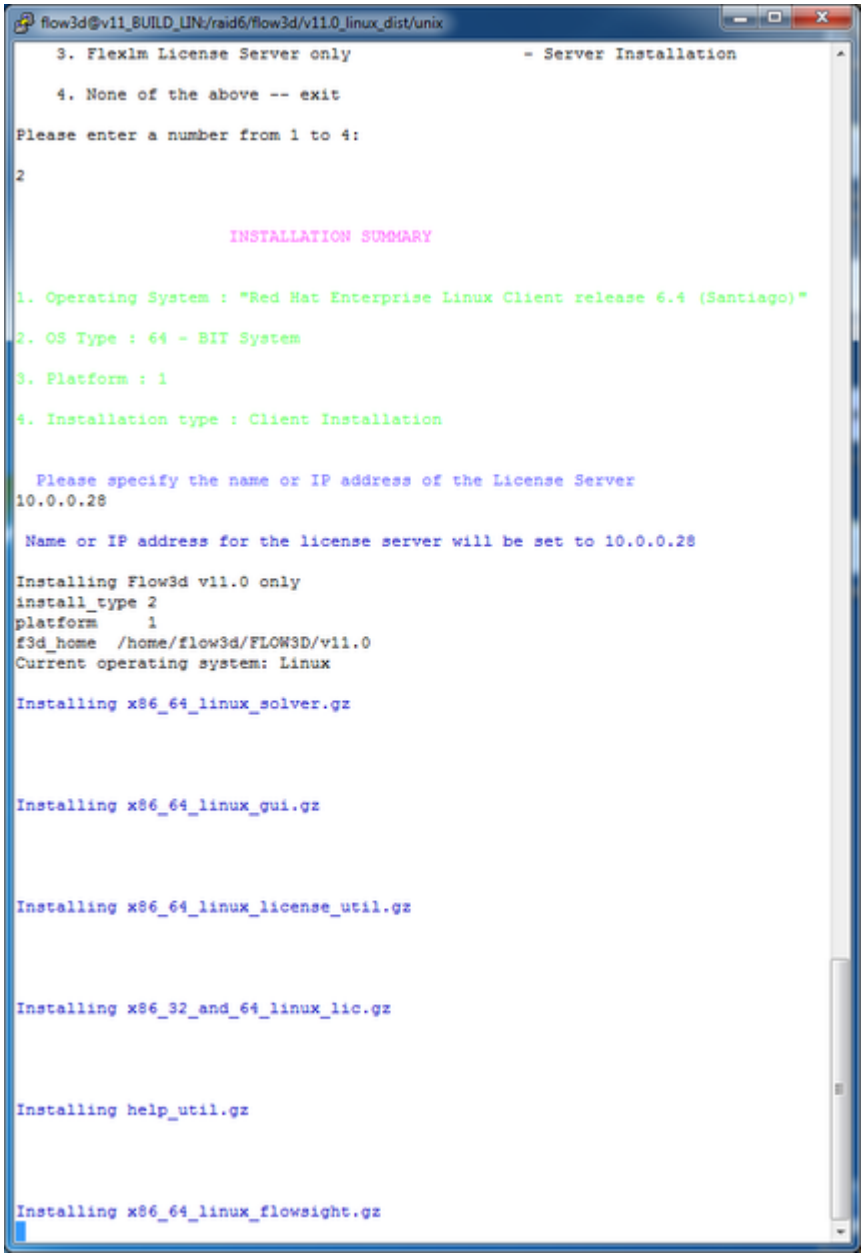
5. If the *FLOW-3D v11.0 only* option is chosen, the script will display an installation summary, and request the name or IPv4 address of the license server. This server machine must be accessible by the client. Unless networking is configured otherwise, `ping hostname` or `ping (ip_address)` will verify whether the machine can be reached.


flow3d@v11_BUILD_LIN:/raid6/flow3d/v11.0_linux_dist/unix
3. Flexlm License Server only - Server Installation
4. None of the above -- exit
Please enter a number from 1 to 4:
2
INSTALLATION SUMMARY
1. Operating System : "Red Hat Enterprise Linux Client release 6.4 (Santiago)"
2. OS Type : 64 - BIT System
3. Platform : 1
4. Installation type : Client Installation
Please specify the name or IP address of the License Server

6. If an Installation Type that includes FlexLM is chosen, the script will display the installation summary and advise that the license will be locked to the ethernet address. USB dongles are no longer supported on Linux.

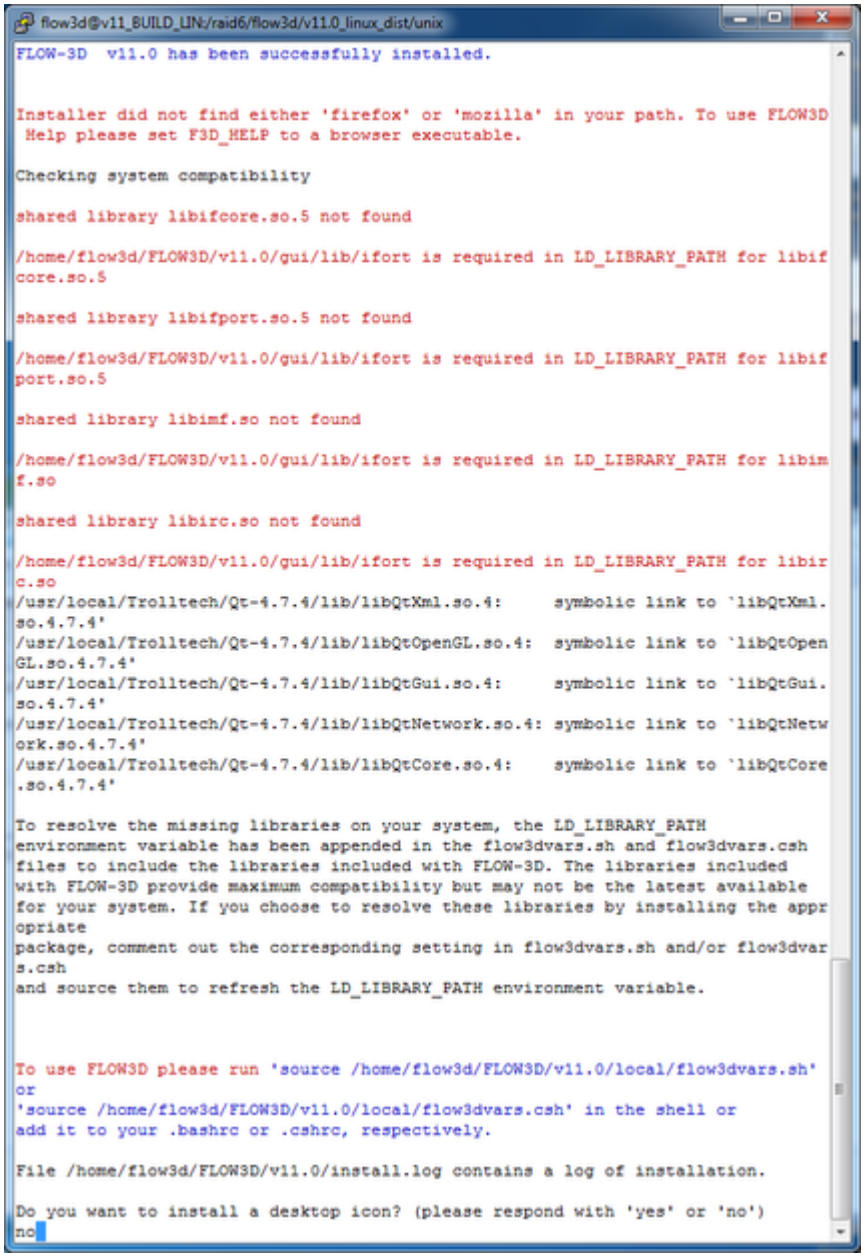

flow3d@v11_BUILD_LIN:/raid6/flow3d/v11.0_linux_dist/unix
1
INSTALLATION SUMMARY
1. Operating System : "Red Hat Enterprise Linux Client release 6.4 (Santiago)"
2. OS Type : 64 - BIT System
3. Platform : 1
4. Installation type : Client/Server Installation
FLOW-3D License will be locked to the Ethernet Address
Please contact Flow-3D License Administrator (licenses@flow3d.com) to get your license file
Would you like to continue ? (please respond with yes or no)

7. The installation will now unpack the tarballs that are needed for the selected Installation Type.

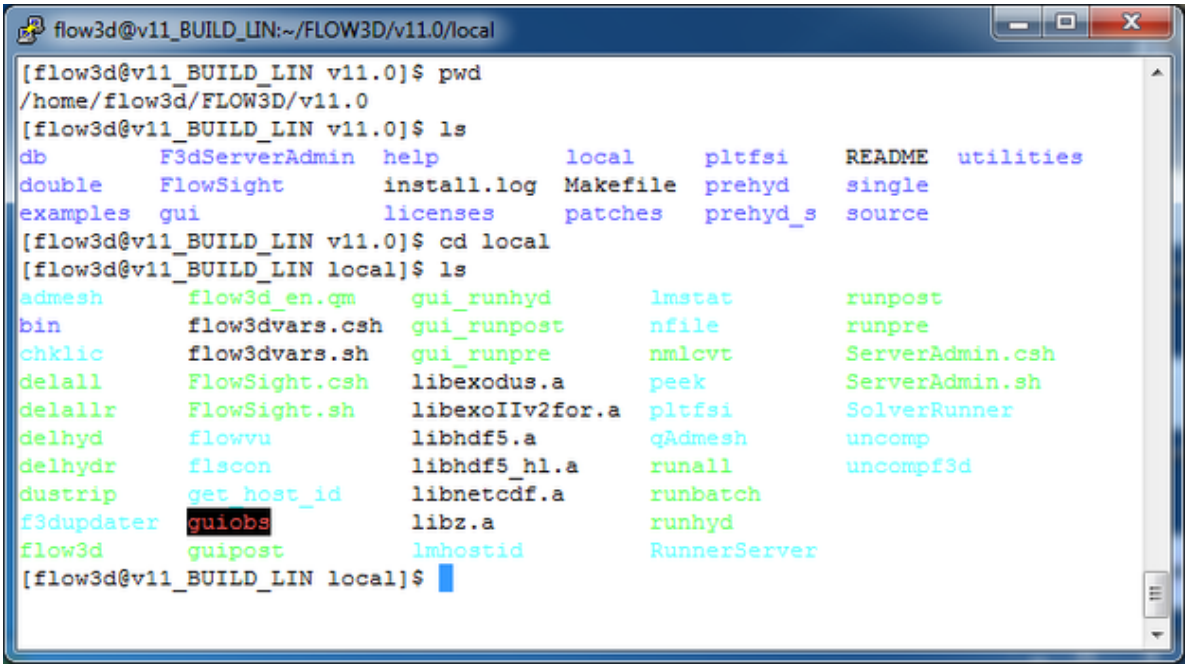

flow3d@v11_BUILD_LIN:/raid6/flow3d/v11.0_linux_dist/unix
3. Flexlm License Server only - Server Installation
4. None of the above -- exit
Please enter a number from 1 to 4:
2
INSTALLATION SUMMARY
1. Operating System : "Red Hat Enterprise Linux Client release 6.4 (Santiago)"
2. OS Type : 64 - BIT System
3. Platform : 1
4. Installation type : Client Installation
Please specify the name or IP address of the License Server
10.0.0.28
Name or IP address for the license server will be set to 10.0.0.28
Installing Flow3d v11.0 only
install_type 2
platform 1
f3d_home /home/flow3d/FLOW3D/v11.0
Current operating system: Linux
Installing x86_64_linux_solver.gz
Installing x86_64_linux_gui.gz
Installing x86_64_linux_license_util.gz
Installing x86_32_and_64_linux_lic.gz
Installing help_util.gz
Installing x86_64_linux_flowsight.gz

8. As a final step, the install script checks the system for the libraries needed to run ***FLOW-3D***. Two shell scripts for launching ***FLOW-3D***, `flow3dvars.sh` and `flow3dvars.csh`, are written into the *local* directory of the installation path. Another pair of scripts is included in the *local* directory to launch FlowSight. These scripts set up the environment and launch the executable. They are named `FlowSight.sh` and `FlowSight.csh`. Another option is to allow the install script to create desktop icons to run ***FLOW-3D*** and FlowSight. These icons set up the environment and run the software. They are only created for the **GNOME** desktop environment which is the default for Red Hat. *If other desktop environments are used, the icons will not be created.*

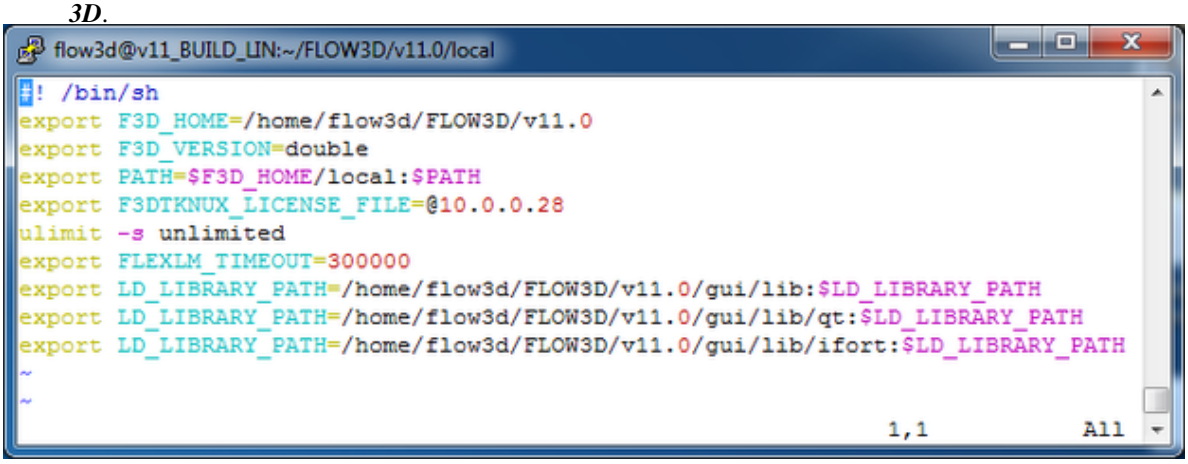
   Necessary libraries are included with the distribution in the `$F3D_HOME/gui/lib` directory. The `LD_LIBRARY_PATH` environment variable is set in the `flow3dvars` scripts so any libraries not found on the system will be accessible. The install script also gives the `source` command that can be used on your system to set up an environment to run ***FLOW-3D***. The command may be added to the user's `.bashrc` or `.cshrc` file, if desired. ***FLOW-3D*** can then be run from a terminal prompt using the command `flow3d&` or `flow3d`.


flow3d@v11_BUILD_LIN:/raid6/flow3d/v11.0_linux_dist/unix
FLOW-3D v11.0 has been successfully installed.
Installer did not find either 'firefox' or 'mozilla' in your path. To use FLOW3D Help please set F3D_HELP to a browser executable.
Checking system compatibility
shared library libifcore.so.5 not found
/home/flow3d/FLOW3D/v11.0/gui/lib/ifort is required in LD_LIBRARY_PATH for libifcore.so.5
shared library libifport.so.5 not found
/home/flow3d/FLOW3D/v11.0/gui/lib/ifort is required in LD_LIBRARY_PATH for libifport.so.5
shared library libimf.so not found
/home/flow3d/FLOW3D/v11.0/gui/lib/ifort is required in LD_LIBRARY_PATH for libimf.so
shared library libirc.so not found
/home/flow3d/FLOW3D/v11.0/gui/lib/ifort is required in LD_LIBRARY_PATH for libirc.so
/usr/local/Trolltech/Qt-4.7.4/lib/libQtXml.so.4: symbolic link to `libQtXml.so.4.7.4'
/usr/local/Trolltech/Qt-4.7.4/lib/libQtOpenGL.so.4: symbolic link to `libQtOpenGL.so.4.7.4'
/usr/local/Trolltech/Qt-4.7.4/lib/libQtGui.so.4: symbolic link to `libQtGui.so.4.7.4'
/usr/local/Trolltech/Qt-4.7.4/lib/libQtNetwork.so.4: symbolic link to `libQtNetwork.so.4.7.4'
/usr/local/Trolltech/Qt-4.7.4/lib/libQtCore.so.4: symbolic link to `libQtCore.so.4.7.4'
To resolve the missing libraries on your system, the LD_LIBRARY_PATH environment variable has been appended in the flow3dvars.sh and flow3dvars.csh files to include the libraries included with FLOW-3D. The libraries included with FLOW-3D provide maximum compatibility but may not be the latest available for your system. If you choose to resolve these libraries by installing the appropriate package, comment out the corresponding setting in flow3dvars.sh and/or flow3dvars.csh and source them to refresh the LD_LIBRARY_PATH environment variable.
To use FLOW3D please run 'source /home/flow3d/FLOW3D/v11.0/local/flow3dvars.sh' or 'source /home/flow3d/FLOW3D/v11.0/local/flow3dvars.csh' in the shell or add it to your .bashrc or .cshrc, respectively.
File /home/flow3d/FLOW3D/v11.0/install.log contains a log of installation.
Do you want to install a desktop icon? (please respond with 'yes' or 'no')
no

9. After installation, the installation directory will contain a directory structure similar to the one shown. A log of the installation, named `install.log` will be at the top level, and the scripts created by the installer will be in the `local` directory.


flow3d@v11_BUILD_LIN:~/FLOW3D/v11.0/local
[flow3d@v11_BUILD_LIN v11.0]$ pwd
/home/flow3d/FLOW3D/v11.0
[flow3d@v11_BUILD_LIN v11.0]$ ls
db F3dServerAdmin help local pltfsi README utilities
double FlowSight install.log Makefile prehyd single
examples gui licenses patches prehyd_s source
[flow3d@v11_BUILD_LIN v11.0]$ cd local
[flow3d@v11_BUILD_LIN local]$ ls
admesh flow3d_en.qm gui_runhyd lmstat runpost
bin flow3dvars.csh gui_runpost nfile runpre
chklic flow3dvars.sh gui_runpre nmlcvt ServerAdmin.csh
delall FlowSight.csh libexodus.a peek ServerAdmin.sh
delallr FlowSight.sh libexoIIv2for.a pltfsi SolverRunner
delhyd flowvu libhdf5.a qAdmesh uncomp
delhydr flscon libhdf5_hl.a runall uncompf3d
dustrip get_host_id libnetcdf.a runbatch
f3dupdater guiobs libz.a runhyd
flow3d guipost lmhostid RunnerServer
[flow3d@v11_BUILD_LIN local]$

10. The `flow3dvars.sh` file illustrates the environment variables that should be set to successfully run ***FLOW-3D***.



1.3 Remote Solving Setup

A new feature in ***FLOW-3D*** v11.0.3 is the ability to connect remote machines (called remote servers) to a primary workstation (referred to as the client) and submit simulations from the primary workstation to run on these remote computers. In addition to running remote simulations, these remote computers retain their ability to run ***FLOW-3D*** as a client. The following sections will discuss how to set up *Remote Servers* and *Clients*.

1.3.1 Terminology and Requirements

The remote solving setup uses several programs on multiple machines, so it helps to define what each program is and the terminology that will be used beforehand. A list of the programs and terms is given below:

- **Server**: The remote machine where the simulation will be run.

- **Client**: The local machine where the setup is done. Simulations can also be run on this machine.
- **FLOW-3D Remote Admin**: This is a configuration program that is run on the server to configure **RunnerServer** for remote solving.
- **RunnerServer**: This program interfaces between the ***FLOW-3D*** user interface and **SolverRunner**. An instance of this runs on both the client (for running local simulations) and the server (for running remote simulations).
- **SolverRunner**: This program interfaces between **RunnerServer** and the solver, **hydr3d**.

Additionally, there are two main requirements for the remote solving feature:

1. All of the clients and servers must have either a working client installation or client/server installation of ***FLOW-3D*** before the remote setup can begin (see *Installation Procedure* for more information on installing ***FLOW-3D***).
2. **SolverRunner**, **RunnerServer**, and ***FLOW-3D*** all communicate using sockets, so certain ports will need to be opened in the firewall.

1.3.2 Remote Servers

1. **Login as an `Administrator` (Windows) or as `root` user (Linux)**:
   - **FLOW-3D Remote Admin** must be run as `root` or `Administrator`. Failure to do so will result in an error.
   - There is only one database file so **FLOW-3D Remote Admin** must be run by only one user.
   - **FLOW-3D Remote Admin** needs to update environment variables, so use `su -` to switch to the `root` user when using the tool on Linux.
2. **Set the environment for Windows machines**: At the system level, set the environment variable `F3DTKNUX_LICENSE_FILE` to point to the location of the ***FLOW-3D*** license file. The value can be copied from the `serveradmin.bat` file located in the `local` folder of the ***FLOW-3D*** installation directory (e.g., `c:\flow3d\v1103\local\ServerAdmin.bat`).
3. **Start the remote server**: **FLOW-3D Remote Admin** is an executable that configures and controls the **RunnerServer** for use as a remote server. It is accessed differently depending on the OS:
   - *Windows*: Use the **FLOW-3D Remote Admin** icon in the ***FLOW-3D*** v11.0.3 Program Group in the Windows Start Menu. This is a shortcut to a batch file in the `local` folder of the ***FLOW-3D*** installation directory (e.g., `c:\flow3d\v1103\local\ServerAdmin.bat`)
   - *Linux*: Run the script `ServerAdmin.sh` (or `ServerAdmin.csh`) located in the `local` folder of the ***FLOW-3D*** installation directory (e.g., `/opt/flow3d/v11.0.3/local/ServerAdmin.sh`)
4. **Server configuration** : Define how the server will communicate with clients.
   - The server configuration settings for **RunnerServer** are accessed on *File→Server Configuration* menu.
   - *Server Name*: The *Server Name* field. provides a way for the server administrator to name the server for tracking purposes.
   - *IP address*: The IP address specified here is the IP address of the server machine. This field will automatically be populated with possible entries; select the one that is appropriate for your network.
   - *Server Port Number*: This is the port through which ***FLOW-3D*** on the client will communicate with **RunnerServer** on the remote machine. *This port must be accessible through the firewall.*
   - *SolverRunner Minimum / Maximum Port Number*: Each time **RunnerServer** receives a job to run, it will spawn a new instance of **SolverRunner** to run the solver. Each instance of **SolverRunner** communicates simulation status information with the ***FLOW-3D*** user interface using a different port, so these fields specify the range of ports that may be used for communication between ***FLOW-3D*** and each **SolverRunner**. *This range of ports must be open for communication through the firewall.* The number of open ports is

recommended to be equal to or greater than the number of solver tokens that are available. On Linux, when using the **iptables** firewall, a command similar to `iptables -A INPUT -p tcp --dport 59150:59200 -j ACCEPT` may be used to open the ports.

5. **Configure user authentication settings**: Give users access to run simulations on this server.
   - User authentication settings are accessed on the *File→User Registration* menu.
   - *Add*: Adds a new user to the authenticated user list.
     - *Full Name*: The name of the user (for the administrator's tracking purposes)
     - *User ID*: This is the username that will be used to authenticate the user when a client attempts to connect to the server.
     - *Password*: The password associated with the user ID for authentication
     - *Confirm Password*: Re-enter the password to avoid typographical errors
     - *Email Address*: The email address of the user. The administrator can send setup information to this address.
     - *Phone Number*: The phone number of the user (for the administrator's tracking purposes)
     - *Home Directory*: The directory on the server where the user's files are to be written before being transferred to the client.
   - *Edit*: Edits the selected user's account settings.
   - *Delete*: Deletes the selected user's account.
   - *Email*: Provided for the administrator to send an email to one or more of the registered clients for disk management, maintenance issues, etc. When the administrator adds a new user during the remote server setup, the software automatically generates an email message with the user ID, password, IP address and server port number to the user. The administrator is given the chance to modify the message if desired and then send it. The same also occurs if any of those fields are modified when the Edit button is selected where the email message specifically references the change.
6. **Start the remote server**: Choose *File→Start Server* to start **RunnerServer**, allowing client machines to connect and submit jobs. When the server is running, this automatically changes to *Stop Server*. The server can also be activated and deactivated by toggling the icon of a running person.

Once **RunnerServer** is configured and running on the server, clients may begin submitting jobs to the server. When a job completes, the results files are compressed, encrypted, and copied back to the client machine where they are decrypted and uncompressed. The results files are not deleted from the server, so the administrator will need to do periodic cleanup of the file system to manage the available disk space. This can be done by selecting one or more simulations in the main list and clicking the *Delete Selected Jobs* button.

If necessary, the server administrator can also kill running jobs by selecting one or more simulations and choosing the *Kill Selected Job* button. If the administrator kills a running job from the server, the simulation is aborted and **the results files are not saved**. This is intended as a **last resort** option for stopping a running simulation; terminating from the client is preferred as the results will be saved and transferred to the client.

Note:

- One instance of **FLOW-3D Remote Admin** supports multiple **client** users.
- Any changes made to the server settings in **FLOW-3D Remote Admin** do not take effect until **RunnerServer** is restarted.
- The remote server cannot be stopped while simulations are running.
- From the server, it is not possible to remove a paused simulation.
- The client and server will only communicate if they have the same GUI and solver version.

- Results files can take a significant amount of time to transfer from the remote server to the client machine.
- The GUI on the client machine may slow down while a results file is being transferred from the remote server.

1.3.3 Clients

Once the remote server setup is complete (see *Remote Servers*), client machines can be configured to use this server for remote solving. When adding a new remote server on a client machine, the relevant setup information is entered in the *Preference→Remote Simulation Preferences→Remote Server Registration* dialog:

- *Server name*: the name of the server machine
- *IP address*: the IP address of the server machine
- *Port Number*: the port on the server machine through which **RunnerServer** communicates with external programs.
- *User ID*: the user ID (for authentication purposes)
- *Password*: the password associated with the user ID (for authentication purposes)

Existing remote servers can be edited or deleted using the respective buttons. After registration, the available remote servers will be listed in the queue and in the menu when submitting jobs to preprocess or run. As with any program running on a network, there are some potential issues that may occur:

- If a remote server disconnects it may be reconnected by right-clicking on the disconnected remote server in the queue (shown in red) and choosing *Try reconnecting to remote server*.
- If the file upload fails when submitting a job, a simulation can be removed from the queue by right-clicking on the simulation and choosing *Remove from queue*.
- If the results file fails to transmit (e.g., due to a connectivity problem) the results file must be manually retrieved from the server.

The *Preference→Remote Simulation Preferences→Automatically download results* preference controls whether the results are automatically or manually downloaded from the server when the simulation completes. If this preference is unchecked, the simulation will remain in the queue until the user clicks on the download button ( ) or removes the simulation from the queue using the right-click menu. The results can only be downloaded after the download status icon ( ) is shown next to the simulation in the queue.

Note:

- The client and server will only communicate if they have the same GUI and solver version.
- Results files can take a significant amount of time to transfer from the remote server to the client machine.
- The GUI on the client machine may slow down while a results file is being transferred from the remote server.

1.4 Licensing Information

1.4.1 FlexNet License Administration Tools

FLOW-3D uses the licensing package FlexNet Publisher, by Flexera Software. FlexNet enables ***FLOW-3D*** licenses to be shared across a network.

Flexera Software provides utilities for users or local license administrators to manage FlexNet licensing activities. The FlexNet End User Manual is available in the `utilities` subdirectory of the ***FLOW-3D*** installation in both `PDF` and `HTML` formats. For Windows computers, the program **lmtools.exe** is provided with all installations. With **LMTOOLS**, users can start, stop and configure FlexNet license servers, get system information, get server information, and more. For more information, please see Chapter 12 of FlexNet End User Manual.

On **Windows** computers, the license manager daemon `lmgrd` will restart automatically whenever the computer is rebooted. On Linux computers, however, the license manager must be started each time the computer is rebooted. To have the license manager start automatically on Linux requires editing the appropriate boot script and inserting the appropriate startup commands. See Section 6.2 of the FlexNet End User Manual for more information. A summary of commonly used administration tools on Linux is included here. Full descriptions of these and other available utilities can be found in Chapter 12 of the FlexNet manual.

- **lmdiag** – diagnoses license checkout problems Useful debugging command: `lmutil lmdiag -n -c "full_license_file_path"`
- **lmdown** – gracefully shuts down all license daemons on the license server node.
- **lmgrd** – the main daemon program for FlexNet
- **lmhostid** – reports the HOSTID of a system
- **lmreread** – causes the license daemon to reread the license file and start any new vendor daemons
- **lmstat** – helps monitor the status of all network licensing activities Useful debugging command: `lmutil lmstat -a -c "full_license_file_path"`
- **lmver** – reports the FlexNet version of a library or binary file

---

Note:

- Using `kill -9` to to shut down the license server on Linux computers is not recommended. Instead, use either `lmdown` or use the `kill` command without the "-9" parameter.
- The license server is not supported on Red Hat Enterprise Linux 7

1.4.2 Licensing Terminology

- **Definition of Client and License Server**: Any computer running ***FLOW-3D*** is referred to as a "client." The computer on which the FlexNet license server is installed will be referred to as the "license server." The client and server may be (and often are) the same machine.
- **Software Package and Software Distribution**: The terms "software package" and "software distribution" will be used to refer to the directory structure containing all of the data files and executables needed to run ***FLOW-3D*** on a particular computer.
- **License Files and Servers**: A valid license file from Flow Science is required to use ***FLOW-3D***. This license file will be sent as an email attachment from Flow Science's License Administrator at licenses@flow3d.com. This license file must be saved in the licenses directory of the ***FLOW-3D*** installation on the machine that will act as the license server. More detail about this is given in the *Windows Installation* and *Linux Installation* sections below.

  As discussed in *Floating vs. Node-Locked Licenses*, ***FLOW-3D*** can be used on multiple computers, but one computer must be selected to be the license server. If the computer chosen to be the license server will not actually be used to run ***FLOW-3D***, then only the FlexNet license server needs to be installed on that machine. Also, if the FlexNet license server will be installed on a Windows computer, a licensing dongle that attaches to the USB port of the computer will be provided by Flow Science. This key is enclosed in the ***FLOW-3D*** package.

Tokens

The total number of ***FLOW-3D*** solver processes that can be run concurrently is determined by the number of "tokens" contained in the license file. The number of tokens available depends on how many were purchased. The license server checks tokens out to client computers on the network, and then checks them back in when the application has completed. In this process, tokens are counted by the license server and when all of the tokens purchased have been checked out, no more tokens can be checked out until a token which is in use has been checked in.

There are several different types of solver tokens. The most important distinction is between "serial" solver tokens and "parallel" solver tokens. Flow Science offers multi-processor versions of ***FLOW-3D*** for both shared-memory (SMP) and distributed-memory (cluster) environments. A shared memory parallel solver token (shown in the license file as `hydr3dp`) enables ***FLOW-3D*** simulations using more than one processor on a multiprocessor computer. For the distributed-memory version, ***FLOW-3D***/MP, a `hydr3d` or `hydr3dp` instance token is required as well as `hydr3dmpi` rank tokens. For example, to run a simulation on 16 processors using ***FLOW-3D***/MP, the license file must have a `hydr3d` token and 15 `hydr3dmpi` tokens.

Unless tokens were purchased for one of the multi-processor versions, the license file will contain one or more serial solver tokens `hydr3d`. These serial solver tokens can be used on computers running any supported operating system. There are essentially an unlimited number of tokens available to run ***FLOW-3D***'s auxiliary programs such as the preprocessor, the postprocessor, and the various visualization options.

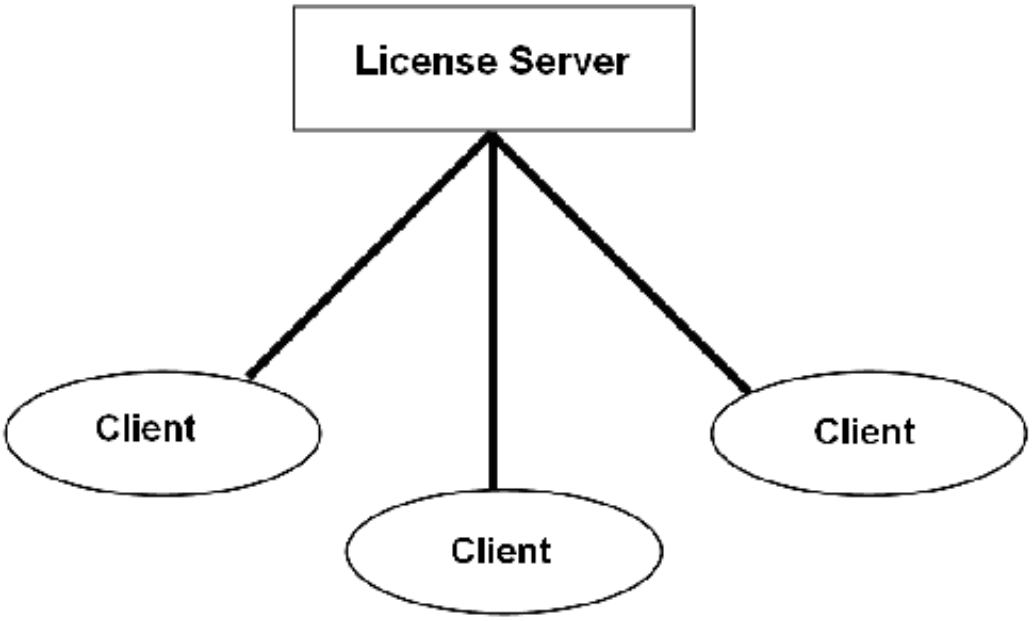
Floating vs. Node-Locked Licenses

There are two general types of licenses used to enable ***FLOW-3D***: "floating" and "node-locked." A floating license is the most common type of license and is available to any computer on the network. Flow Science can also provide a node-locked license. Node-locked licenses can only be used on the designated computer.

Both floating and node-locked licensing schemes require that one computer be designated as the license server.

- **Floating Licenses**: To use floating licenses, it is important that both the network and the computer intended for use as the license server are reliable. The TCP/IP protocol must be loaded and functional, and all intended clients must be able to access the license server. Floating licenses may also be accessed through a VPN tunnel. The computer that is acting as the license server may be any computer on the network, and does not need to have ***FLOW-3D*** installed. The license server may be a Windows or a Linux computer. Users may load ***FLOW-3D*** on any client running a supported Linux or Windows computer on the network. A hardware key is not needed on a client computer unless it uses a node-locked license.

  To employ a floating license on a single computer, ***FLOW-3D*** should be installed with the client/server option. The license server and the clients may reside on the same local area network, over a WAN, or across VPN. ***FLOW-3D*** must be installed locally on each client. An example of a floating license configuration is shown below.



- **Node-Locked Licenses**: Users may choose to have their solver tokens locked to a particular computer so that only that computer can run the solver.

Both floating and node-locked licensing schemes have their advantages and disadvantages. A floating license is advised if several people are sharing a license, or it may be necessary to run ***FLOW-3D*** on a different computer if a particular computer is busy. With a floating license, a problem can be set up on one computer while using another to run the ***FLOW-3D*** solver on a second problem. If other machines or problems are using all available tokens, the solver will not run until a token becomes available. The main advantage of a node-locked license is the ability to ensure that token(s) are always available to a specific machine and not available to others on the network.

Note: All licenses are floating licenses unless specifically requested as node-locked.

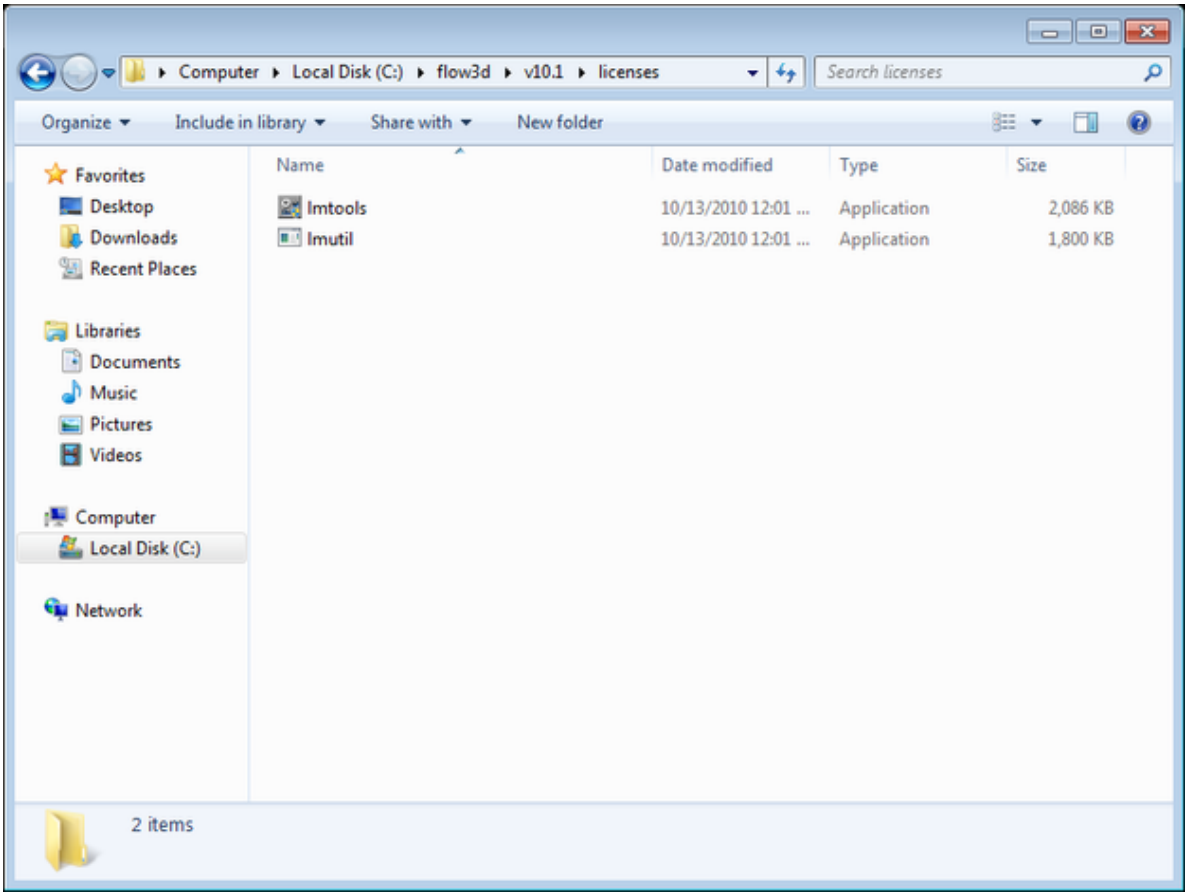
1.4.3 Moving License Servers

When a floating license is locked to a fixed host ID, such as an Ethernet address or host ID, it is recommended that users choose a server which is likely to be used for the duration of the license. Changing license servers can be done once a year without incurring a re-licensing fee. Re-licensing fees are not necessary (maximum one change per year) when users use a USB or parallel port hardware key (dongle) as their host ID. To move the dongle (and hence license server) to a different computer, the user may change the first line in the license file to reflect the computer name change. For example, if the license server was previously running on a server named Celsius and will be moved to Kelvin, the first line in the license file would be changed from `SERVER Celsius FLEXID= "your ID"` to `SERVER Kelvin FLEXID= "your ID"`.

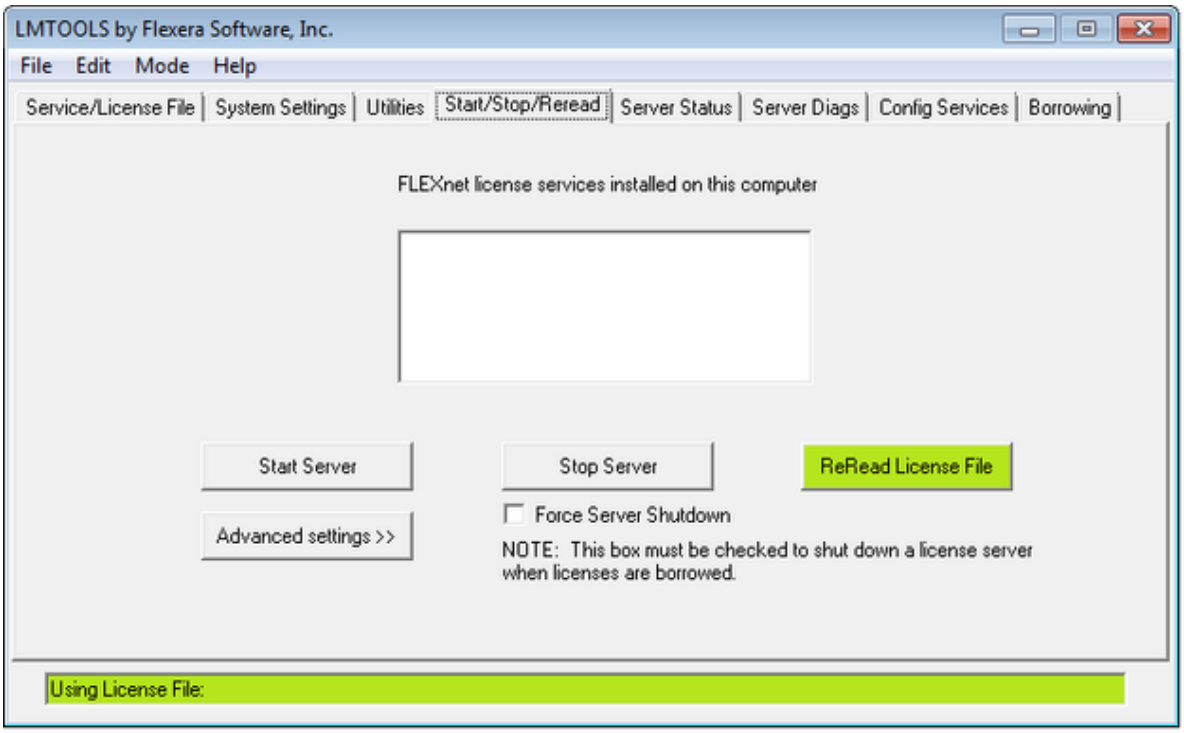
1.4.4 Installing a New/Replacement License File

Windows

1. When a new or replacement `flow3d.lic` is received from the License Administrator, place it into the `licenses` subdirectory found within the directory where ***FLOW-3D*** was installed.



2. Start the **LMTOOLS** utility, from either this directory, the shortcut on the desktop, or the icon in the *Start Menu*. Click the *Start/Stop/Reread* tab. Verify that the license file is in the correct location by checking the directory shown (highlighted in the figure below). If correct, click the *ReRead License File* button (also highlighted).

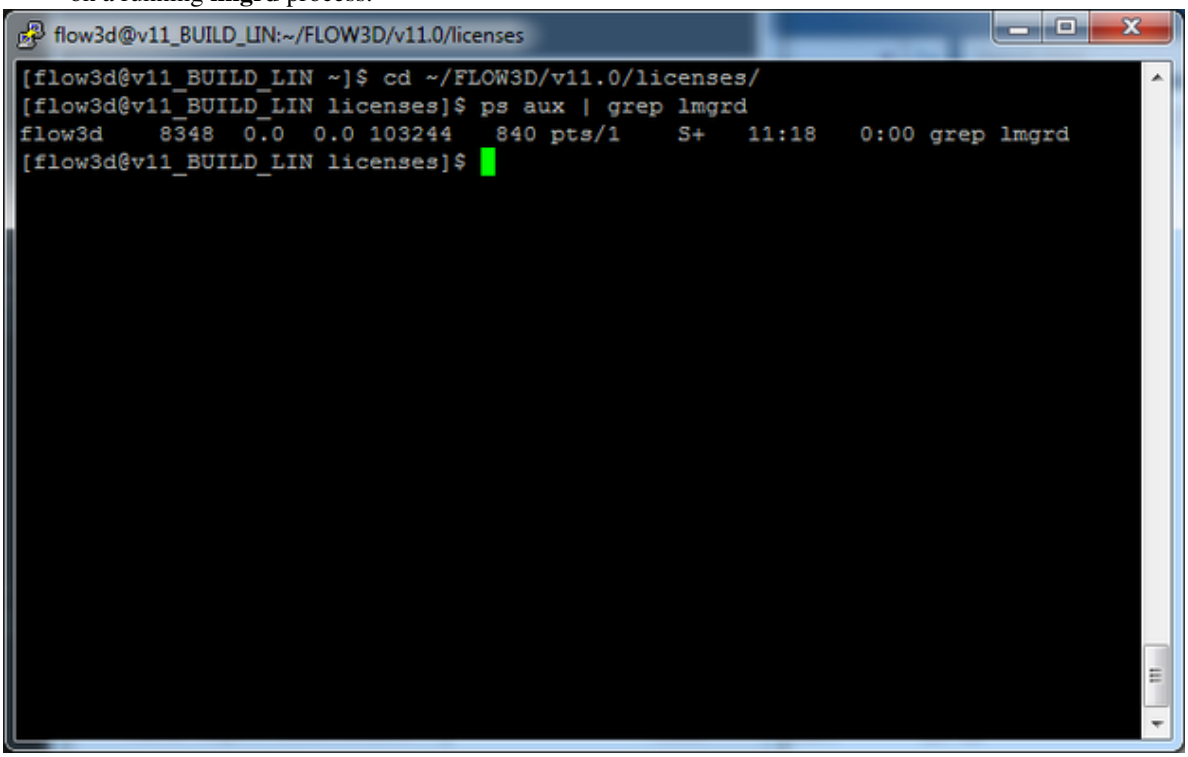


Linux

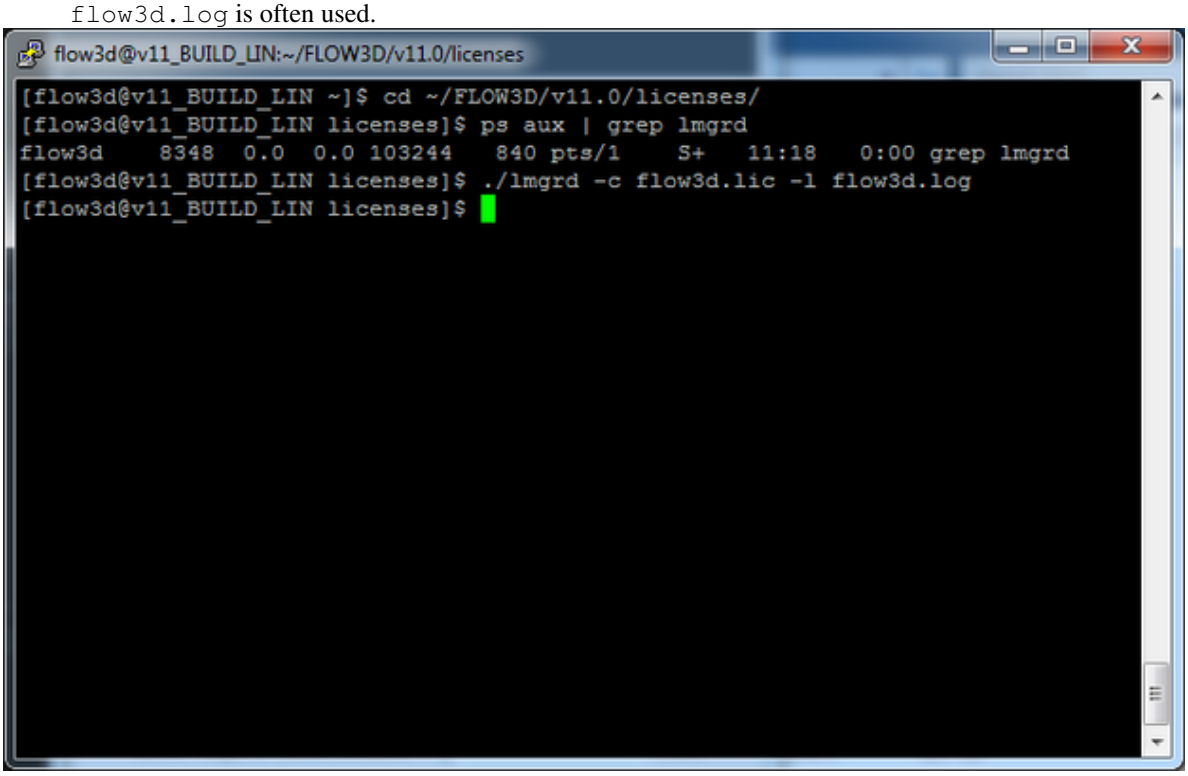
1. When a new or replacement `flow3d.lic` is received from the License Administrator, place it into the `licenses` subdirectory found within the directory where ***FLOW-3D*** was installed.

2. Check whether the license server is running using `ps aux | grep lmgrd`. This will provide the PID of

any running license servers. They can be killed using `kill (PID)`. It is not recommended to use `kill -9` on a running **lmgrd** process.


flow3d@v11_BUILD_LIN:~/FLOW3D/v11.0/licenses
[flow3d@v11_BUILD_LIN ~]$ cd ~/FLOW3D/v11.0/licenses/
[flow3d@v11_BUILD_LIN licenses]$ ps aux | grep lmgrd
flow3d 8348 0.0 0.0 103244 840 pts/1 S+ 11:18 0:00 grep lmgrd
[flow3d@v11_BUILD_LIN licenses]$

3. It is recommended to run the license server as a user, not as root. The command to start the new lmgrd process is `lmgrd -c flow3d.lic -l logfile.log`, where the logfile name may be changed as needed. `flow3d.log` is often used.


flow3d@v11_BUILD_LIN:~/FLOW3D/v11.0/licenses
[flow3d@v11_BUILD_LIN ~]$ cd ~/FLOW3D/v11.0/licenses/
[flow3d@v11_BUILD_LIN licenses]$ ps aux | grep lmgrd
flow3d 8348 0.0 0.0 103244 840 pts/1 S+ 11:18 0:00 grep lmgrd
[flow3d@v11_BUILD_LIN licenses]$ ./lmgrd -c flow3d.lic -l flow3d.log
[flow3d@v11_BUILD_LIN licenses]$

1.4.5 Troubleshooting License Problems

Windows

This guide provides a series of steps that can be used to diagnose and resolve licensing issues with ***FLOW-3D***. Feel free to contact our support staff at support@flow3d.com or at (505) 982-0088 if you have trouble at any point.

1. Close any open instances of ***FLOW-3D*** and close *RunnerServer.exe* (an application running in the task tray). After closing ***FLOW-3D***, confirm that there are no instances of *flow3d.exe*, *hydr3d.exe*, *RunnerServer.exe*, *guiobs.exe*, or *flscon.exe* running by looking at the processes tab of the task manager. If there are, terminate the process.
2. Verify that the correct install option was chosen.
   (a) **Client**: You intend to run ***FLOW-3D*** on this computer but will install the license server on another computer.
   (b) **Server / Client**: You intend to run both ***FLOW-3D*** and the license server on this computer.
   (c) **Server**: You are only installing the license server on this computer.

   If the *Server or Server/Client* installation was not selected for the machine running the license server you will need to run the *Server* installation on this computer. You can check if the necessary software was installed by looking for the files *F3DTKNUX.exe* and *lmgrd.exe* in the licenses folder of the installation directory on the server machine. If they are in this folder then the server software was installed.
3. Verify that the license file (*flow3d.lic*) is in the correct location. It should be in the licenses subfolder of the installation directory on the server machine (e.g. `C:\flow3d\v1103\licenses`).
4. Make sure you are using the correct license file for your server machine. You will need to open the license file (*flow3d.lic*) in a text editor on the server machine.
   (a) Make sure the server machine computer name (or IP address) matches what is in the license file. This parameter may be edited in the license file to match the computer.
      i. The first line of the license file will read `SERVER <name> ...`
      ii. The computer name, `<name>`, can be found from *My Computer* → *Properties*. Alternatively, the IP address can be found by opening a command prompt and typing `ipconfig -all`. The IP address looks like: `xx.x.x.xxx`.
   (b) If you were sent a USB dongle:
      i. Verify that the dongle is plugged into the server machine and that the red light on the dongle is lit.
      ii. Make sure that the dongle matches the license file
         A. Compare the flexID marked on the dongle with the one at the top of the license file (open in a text editor). The first line of the license file should look like: `SERVER <name> FLEXID=<flexID> <port>` , where `<flexID>` is a string of numbers and characters and cannot be modified.The dongle flexID must match what is specified in the license file.
         B. This can also be checked by opening LMTOOLS, located in the licenses folder of the install directory, and viewing the FLEXID box on the system settings tab.
   (c) If your license is locked to an Ethernet (MAC) address:
      i. Make sure the server network card physical address matches what is specified in the license file. The value in the license file cannot be changed.
         A. The first line of the license file will read `SERVER <name> <physical address> <port>`

B. The server network card physical address, <physical address>, can be found by opening a command prompt and typing ipconfig -all. The server network card physical address looks like: xx-xx-xx-xx-xx-xx

5. Check that the necessary environment variables are set on the client machines.
   (a) Right-click on the ***FLOW-3D*** icon and choose *Edit*.
   (b) Verify that the following variables have the correct values. Note that the values below are based on the default install location.
      i. F3D_HOME = C:\flow3d\v1103 (the ***FLOW-3D*** installation directory)
      ii. PATH = C:\flow3d\v1103\local
      iii. F3DTKNUX_LICENSE_FILE = @xx.x.x.xxx (this should point to the server IP address preceded by the @ symbol)
6. Verify that the firewall on the server machine has exceptions for the license daemons.
   (a) Go to *Start* → *Control Panel* → *Windows Firewall*.
   (b) Click *Allow a program or feature through Windows Firewall*.
   (c) Verify that *FLOW-3D_v11_license_daemon* and *FLOW-3D_v11_vendor_daemon* are in the list and checked for the appropriate networks. If not, choose *Allow another program...* and browse to the licenses folder of the installation directory and add exceptions for *lmgrd.exe* and *F3DTKNUX.exe.*
7. Now restart the license server and reread the license file on the server machine.
   (a) Open a command prompt and change to the licenses folder in the install directory (e.g. cd c:\flow3d\v1103\licenses)
   (b) Type lmutil lmdown -c flow3d.lic to shut down any running license daemons
   (c) Type lmgrd -c flow3d.lic -l flow3d.log to restart the server. You may be notified that the firewall is blocking the license daemons. If this is the case, allow exceptions for *F3DTKNUX.exe* and *lmgrd.exe*
   (d) Perform a status check by typing lmutil lmstat -c flow3d.lic. This will display the server status. It should now report:

```
[Detecting lmgrd processes...]
License server status: <port>@<name>
License file(s) on <name>: @<IPaddress>
License file(s) on <name>: <licensepath>: <name>: license server UP (MASTER) v11.9
Vendor daemon status (on <name>): F3DTKNUX: UP v11.9
```

   Where <port> is the port number being used by the server, <name> is the name of the computer running the server (as it appears on the network), <IPaddress> is the IP address of the server, and <licensepath> is the full directory location of the license file (*flow3d.lic*). Note that running multiple license servers on the same machine may result in conflicts in port usage. If there is a conflict, change (or add) the port number, <port>, in the license file and repeat step 6. The default port number is 27000.
8. You should now be able to launch and run ***FLOW-3D***.

Linux

This guide provides a series of steps that can be used to diagnose and resolve licensing issues with ***FLOW-3D***. Feel free to contact our support staff at support@flow3d.com or at (505) 982-0088 if you have trouble at any point.

1. Close any open instances of ***FLOW-3D*** and close *RunnerServer.exe*. It is. worth verifying that there are no instances of *flow3d.exe*, *RunnerServer.exe*, *hydr3d.exe*, *guiobs.exe*, or *flscon.exe* running by typing `ps -A | grep flow3d`, `ps -A | grep hydr3d`, etc. If something is running it can be stopped using the kill command.
2. Verify that the correct install option was chosen.
   (a) **Client**: You intend to run ***FLOW-3D*** on this computer but will install the license server on another computer.
   (b) **Server / Client**: You intend to run both ***FLOW-3D*** and the license server on this computer.
   (c) **Server**: You are only installing the license server on this computer.

   If the *Server* or *Server/Client* installation was not run on the machine running the license server you will need to run the Server installation on this computer. You can check if the server software was installed by looking in the licenses folder of the installation directory on the server machine for the files *F3DTKNUX.exe* and *lmgrd.exe*. If they are in this folder then the server software was installed.
3. Verify that the license file (*flow3d.lic*) is in the correct location. It should be in the licenses subfolder of the installation directory on the server machine (e.g. `/opt/flow3d/v11.0.3/licenses`).
4. Make sure you are using the correct license file for your server machine. You will need to open the license file (*flow3d.lic*) in a text editor (or using more) on the server machine.
   (a) Make sure the server machine computer name (or IP address) matches what is in the license file. This parameter may be edited in the license file to match the computer.
      i. The first line of the license file will read `SERVER <name> ...`
      ii. The IP address, `<name>`, can be found by entering `/sbin/ifconfig` in to a terminal. The eth0 section will contain the information. The IP address is called inet addr and looks like: `xx.x.x.xxx`
   (b) If you were sent a USB dongle (RHEL only):
      i. Verify that the dongle is plugged into the server machine and the red light on the dongle is lit.
      ii. Make sure that the dongle matches the license file
         A. The first line of the license file should look like: `SERVER <name> FLEXID=<flexID> <port>` , where `<flexID>` is a string of numbers and characters.
         B. The flexID is marked on the dongle and at the top of the license file (open in a text editor). The dongle flexID must match what is specified in the license file and the value in the license file cannot be modified.
         C. This can also be checked by opening LMTOOLS, located in the licenses folder of the install directory, and viewing the FLEXID box on the system settings tab
   (c) If your license is locked to an Ethernet (MAC) address:
      i. Make sure the server network card physical address matches what is specified in the license file. The value in the license file cannot be changed.
         A. The first line of the license file will read `SERVER <name> <physical address> <port>`.
         B. The server network card physical address, `<physical address>`, can be found by entering `/sbin/ifconfig` into a terminal. The eth0 section will contain the information. The server network card physical address is called HWaddr and looks like: `xx-xx-xx-xx-xx-xx`
5. Check that the necessary environment variables are set on the client machines. The easiest way to do this is to run one of the included shell or c-shell files.

(a) Open a terminal and change to the local directory in the install directory (e.g. `cd /opt/flow3d/v11.0.3/local`)

(b) Type `more flow3dvars.sh` (or `more flow3dvars.csh`) and verify that the environment variables are correct. The variables and example definitions are shown below. If the definitions are incorrect they can be fixed using a text editor like vi.

i. `export F3D_HOME = /opt/flow3d/v11.0.3`: This should point to the ***FLOW-3D*** installation directory.

ii. `export F3D_VERSION=double`: Sets the default solver type to double-precision.

iii. `export PATH=$F3D_HOME/local:$PATH`: Tells the file system where to find the ***FLOW-3D*** executable

iv. `ulimit -s unlimited`: This unlimits the stack size. Not doing this is a common cause of segmentation faults.

v. `export F3D_HELP=/usr/bin/firefox` (default browser for help files)

vi. `export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:$F3D_HOME/gui/lib`

vii. `export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:$F3D_HOME/gui/lib/qt`

viii. `export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:$F3D_HOME/gui/lib/ifort`

ix. `export F3DTKNUX_LICENSE_FILE = @xx.xx.xx.xxx`: This variable is used on client machines and should point to the server name or IP address.

(c) Type `source flow3dvars.sh` (or `source flow3dvars.csh`) to set the variables defined in the shell (or c-shell). This command will need to be called every time a new terminal is opened to launch ***FLOW-3D***. Alternatively, this command can be added to the .bashrc file to make this an automatic process.

6. Now restart the license server and reread the license file on the server machine

(a) Open a terminal and change to the licenses directory in the install directory (e.g. `cd /opt/flow3d/v11.0.3/licenses`)

(b) Type `./lmdown -c flow3d.lic` to shut down the running license daemons

(c) Type `./lmgrd -c flow3d.lic -l flow3d.log &` to restart the server

i. The `&` is to run the daemons in the background

ii. You may need to allow firewall exceptions for *F3DTKNUX.exe* and *lmgrd.exe*

(d) Type `./lmreread -c flow3d.lic` to reread the license file

(e) Perform a status check by typing `./lmstat -c flow3d.lic`. This will display the server status. It should now report:

```
[Detecting lmgrd processes...]
License server status: <port>@<name>
License file(s) on <name>: @<IPaddress>
License file(s) on <name>: <licensepath>: <name>: license server UP (MASTER) v11.9
Vendor daemon status (on <name>): F3DTKNUX: UP v11.9
```

Where `<port>` is the port number being used by the server, `<name>` is the name of the computer running the server (as it appears on the network), `<IPaddress>` is the IP address of the server, and `<licensepath>` is the full directory location of the license file (*flow3d.lic*).

(f) Note that running multiple license servers on the same machine may result in conflicts in port usage. If there is a conflict, change (or add) the port number, `<port>`, in the license file and repeat step 6. The default port number is 27000.

7. You should now be able to launch and run ***FLOW-3D***.

1.5 License Agreement and Copyright

1.5.1 FLOW-3D End User License Agreement

THE TERMS AND CONDITIONS OF THIS END-USER LICENSE AGREEMENT SHALL GOVERN YOUR USE OF THE SOFTWARE. READ THIS LICENSE CAREFULLY BEFORE INSTALLING AND USING THE SOFTWARE. BY USING THE SOFTWARE, YOU AGREE TO BE BOUND BY THE TERMS OF THIS AGREEMENT.

1. The Software is licensed to You by Flow Science, Inc. (**Licensor**) on a nonexclusive and nontransferable basis, subject to the commercial terms specified in the Acquisition Agreement and subject to the terms and conditions set forth herein.

   IF YOU ARE AN ACADEMIC USER, YOU UNDERSTAND THAT YOU ARE OBLIGATED TO RESTRICT YOUR USE OF THE SOFTWARE TO TEACHING, ACADEMIC AND/OR UNSPONSORED RESEARCH, OR SPONSORED RESEARCH THAT CAN AND WILL BE FREELY PUBLISHED WITH NO PROPRIETARY RESTRICTIONS.

2. Definitions: **Acquisition Agreement** means a separate executed agreement between You (or the entity under whose authorization You are using the Software) and Licensor or one of its authorized distributors. Such agreement governs, among other things, the specific ***FLOW-3D*** Product that is licensed to you, the number of allowed concurrent instances, price, license duration, and rights to technical support and upgrades.

   - **Agreement** means this End-User License Agreement
   - **Documentation** means manuals, release or installation notes related to ***FLOW-3D*** Products and/or FlowSight, including electronic versions thereof.
   - ***FLOW-3D* Product** means those computational fluid dynamics software programs, sold and distributed individually as ***FLOW-3D***, ***FLOW-3D***/MP, or ***FLOW-3D*** Cast Cast, and any other similar product which is now available or may become available from Licensor under the same family name.
   - **FlowSight** means the post-processing and visualization tool packaged with the ***FLOW-3D*** Product. FlowSight is a custom version of EnSight, limited to use in conjunction with ***FLOW-3D*** Products only, which is distributed by Licensor under license from Computational Engineering International, Inc. (CEI).
   - **Software** means such computer program from among the ***FLOW-3D*** Products that is licensed to You hereunder, FlowSight, the Documentation, and any backups or other copies.

3. License Management. In connection with the License granted herein, Licensor will issue one or more electronic license files which shall be tied to either a **FLEXlm** hardware dongle or to the Ethernet address of a designated server. Such license file(s) will enable the running of the Software's preprocessor and postprocessor and control the number of concurrent instances of the Software's solver module and FlowSight in use. You agree not to take any steps to avoid or defeat the purpose of such licensing measures. Use of the Software without a license file, or in excess of the number of authorized concurrent instances is expressly prohibited. Upon request, You agree to submit log files to Licensor for verification. Use of the Software on a network is restricted to a fifty-mile radius around one geographic location, unless otherwise authorized by Licensor.

4. Maintenance. If arrangements for technical support have been made, only the person designated by You as the **Registered User**, or persons who have attended a ***FLOW-3D*** Training Class, will be entitled to contact Licensor or its authorized distributor to seek technical support. Technical support will be provided via telephone, e-mail, web-based meetings, fax, and/or mail during normal business hours.

   In order to enable Licensor to provide timely and beneficial technical support for the Software, You agree to install updates, fixes, circumventions, and corrective code to the Software in a reasonable time after receipt thereof and to be responsible for the installation and administration of the Software on platforms officially

supported by Licensor). Licensor shall not be obligated to provide technical support unless You are using the current version of the ***FLOW-3D*** Product You are licensed to use or the previous major release thereof.

If You are an academic user and have purchased maintenance service, such service is limited to the following: (a) Licensor will provide User with software upgrades when they become available; (b) Licensor will assist in installation of the code and will answer questions about how to use the input variables to implement the various models in ***FLOW-3D***; (c) at its option, Licensor will analyze results that appear obviously incorrect because they don't seem to reproduce simple analytical results or expected conservation laws; (d) Licensor will also provide access to a number of subroutines to allow users to implement small changes to ***FLOW-3D***, including boundary conditions and material properties; (e) Licensor will not assist in the making of revisions or customizations to the Software.

5. Use and Limitations. The Software is the property of Licensor, or with respect to FlowSight, of CEI. You recognize that the Software is copyrighted under the laws of the United States of America and international treaty provisions. Notwithstanding the copyrights, the Software contains trade secrets and proprietary information of Licensor and CEI, and You agree not to act in contravention of any of Licensor's or CEI's intellectual property rights. You acknowledge that Licensor and CEI own the aforementioned rights and have the following exclusive rights with regard to the applicable portions of the Software: to reproduce it; to adapt, transform or rearrange it; to prepare derivative works from it; and to control its distribution.

   The Software is licensed, not sold. No title to or ownership of the Software or any part thereof is hereby transferred to You, and all rights not specifically granted to You shall remain with Licensor and CEI, as appropriate. You acknowledge that, by virtue of this Agreement, You acquire only the right to use the Software pursuant to the terms of this Agreement.

   You agree to take all necessary action to protect the confidential and proprietary information in the Software to avoid the disclosure of the contents of the Software to any other person, firm, or corporation, and to treat the Software with the same degree of care that You provide Your own confidential information. You agree to credit Licensor and the Software in any written or verbal presentation where results obtained using the Software are discussed.

   You may use the Software only as expressly permitted in this Agreement. You may not: (i) rent, loan, transfer, relicense, distribute, or otherwise assign the Software or any or all of Your rights hereunder without prior written consent of Licensor, and any attempt at the same shall be wholly void and ineffective for all purposes; (ii) copy the Software (except to make archival copies for backup purposes); (iii) decompile, disassemble, or otherwise reverse engineer the Software; (iv) publish the Software for others to copy; or (v) use the Software in any way that is against the law or contrary to the terms of this Agreement. You may use the Documentation only in support of Your use of the Software and You may print or duplicate the Documentation, but only for internal use and provided that each copy includes all of the copyright or related notices of the original.

   The License and the rights granted hereunder are subject to Your compliance with all laws, regulations, orders, or other regulations relative to export or redistribution of the Software that may now or in the future be imposed by the government of the United States or any agency thereof or of any other country into which the Software may be transported. Any act of noncompliance shall immediately terminate this License.

   If You are the USA Department of Defense ("DOD"), the Software is subject to "Restricted Rights," as that term is defined in the DOD Supplement to the Federal Acquisition Regulations section 252.227-7013(c). If You are any unit or agency of the U.S. Government other than the DOD, Your rights in the Software will be defined in paragraph 52.227-19(c)(2) of the Federal Acquisition Regulations. Any use, duplication, reproduction, or disclosure by the U.S. Government is subject to such restrictions. Contractor/Manufacturer is: Flow Science, Inc., 683 Harkle Road, Santa Fe, NM 87505.

6. Termination. This Agreement shall terminate upon occurrence of any of the following events: (a) any breach of Sections 3, 4 or 5 hereof (effective immediately); (b) Your failure to observe or perform any other material covenants, terms, and conditions of this Agreement where such nonperformance is not fully remedied by You within thirty (30) days after written notice from Licensor; or (c) the filing of a petition for Your bankruptcy, whether voluntary or involuntary, or an assignment of Your assets made for the benefit of creditors, or the

appointment of a trustee or receiver to take charge of Your business for any reason, or Your becoming insolvent or voluntarily or involuntarily being dissolved.

Upon termination of the Agreement, Licensor shall have the right, without notice, to repossess the Software. In addition, Licensor shall have all other remedies and damages available to it in law or equity. Licensor is entitled to reimbursement from You for any expenses, legal fees, and/or court costs incurred in the enforcement of its rights hereunder or in the collection of damages.

7. Warranties. The Licensor warrants that it has the right to grant to You a license and warrants that the Software does not infringe third party intellectual property rights. Licensor shall indemnify and hold You harmless from and against any claim of infringement of a United States patent or copyright based upon the Software, provided You gives Licensor prompt notice of and the opportunity to defend any such claim. Licensor shall have the right to settle such claim or, at Licensor's option, provide You: (i) a paid-up license; (ii) substitute functionally equivalent software; or (iii) a refund of a pro rata portion of the license fee paid for the Software.

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